NOVEMBER 1951

FOUNDRY

...WHEREVER METALS ARE CAST

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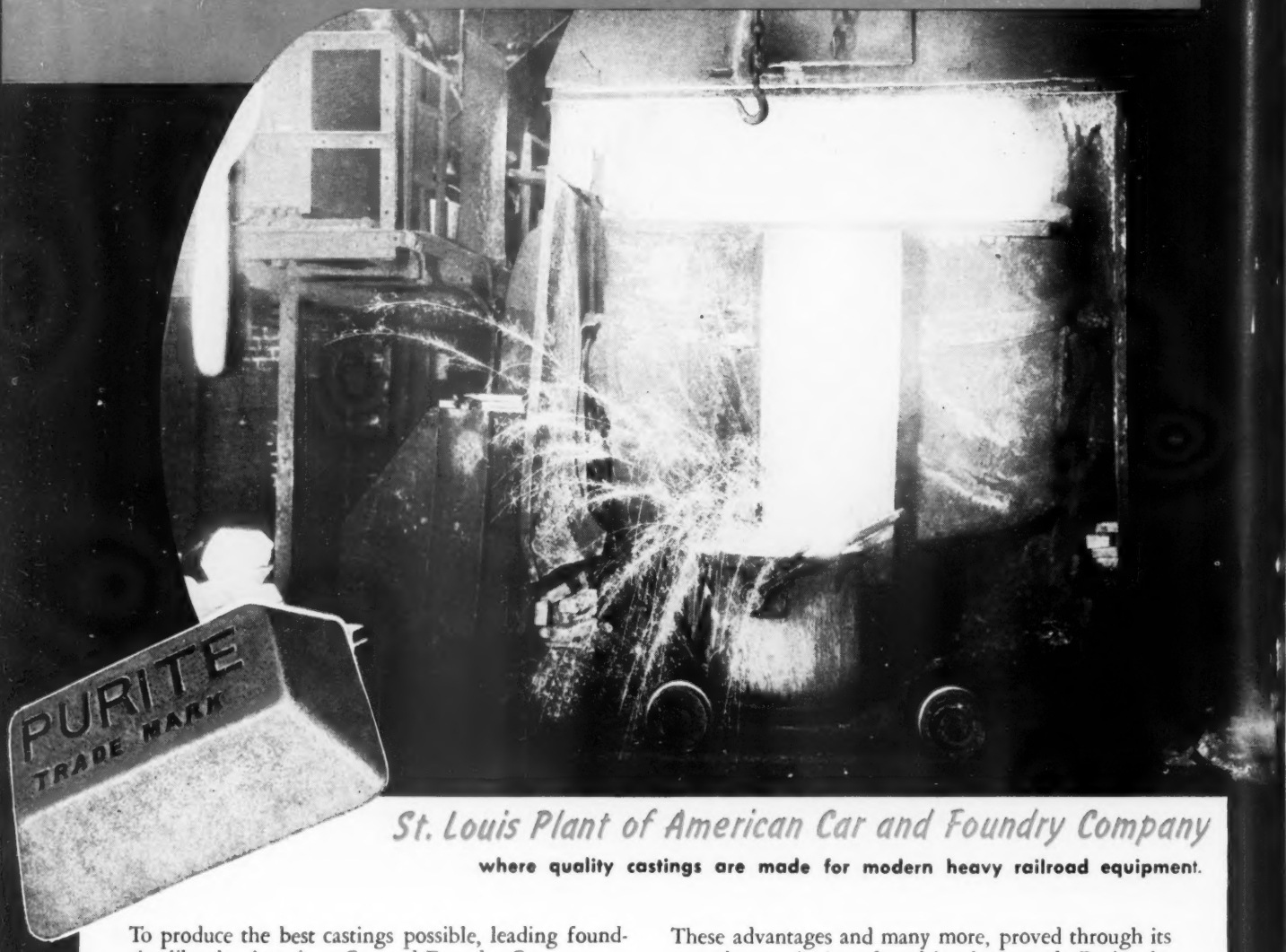
RESEARCH

...in a Pipe Foundry

—see page 88

refine with PURITE

FOR CLEANER...SOUNDER IRON CASTINGS



St. Louis Plant of American Car and Foundry Company

where quality castings are made for modern heavy railroad equipment.

To produce the best castings possible, leading foundries like the American Car and Foundry Company refine their iron with Purite. Applicable both as a cupola flux and as a ladle desulphurizing agent, Purite has won industry-wide acceptance because:

- **Purite gives 100% fluxing action in the cupola — 100% desulphurizing action in the ladle.**
- **Purite gets to the iron quicker — no faster desulphurizer made.**
- **Purite is time-tested and proven for unsurpassed desulphurizing uniformity.**
- **Purite comes in 2-lb. pigs — no weighing or measuring required.**
- **Purite is 100% fused soda ash — you do not pay for inert materials.**
- **Purite does not crumble — no waste — no dust.**
- **Purite can be shipped in bulk carloads at substantial savings over bag shipments — is easily stored without deterioration.**

These advantages and many more, proved through its everyday use in iron foundries, have made Purite the universal cupola flux and ladle desulphurizing agent.

A new booklet, "Refining and Desulphurizing Cupola Iron," illustrates in detail the accepted ways in which Purite is most effective. Write for your copy today. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.

PURITE — 100% Fused Soda Ash. The Scientific Flux for Better Melting and Cleaner Iron.

PURITE — is sold by all leading foundry supply houses in the United States and Canada.

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CHEMICALS

8949

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

NISILOY

A POWERFUL, POSITIVE INOCULANT

Cuts Final Cost of Gray Iron Castings

by improving

MACHINABILITY, GRAIN STRUCTURE, UNIFORMITY

BENEFITS TO FOUNDRYMEN

Reduces Rejects—Used for structure control of cast iron, Nisiloy helps your foundry meet daily schedules for uniform lots of machinable gray iron castings.

Promotes Sound Castings—Diffusing rapidly throughout the melt, Nisiloy promotes a dense, close-grained product.

Curbs Breakage—Even where section thickness varies sharply, Nisiloy serves to eliminate chilled edges and surfaces, thus affording a tougher cast iron that resists breakage in shop handling.

No Scrap Problem—Containing only elements that dissolve freely in iron, Nisiloy permits remelting sprues and gates in any successive melt without risk of adding chill-forming elements.

Fewer Base Mixtures—Often a single base mixture may be used in the cupola to which Nisiloy is added in the ladle, with the consequent flexibility of pouring off thin or thick sectioned castings as desired.

For full information about this nickel-silicon alloy, one of the most useful products ever offered for improving machinability and structure of gray iron castings, fill in and mail the coupon below.

BENEFITS TO CASTING USERS

Excellent Machining Qualities—The dense, gray, machinable structure secured with Nisiloy reduces machining time, tool wear, rejects and costs.

Increased Wear-Resistance—The formation and distribution of finely divided random flake graphite accomplished with Nisiloy assures highly improved resistance to wear.

Improved Toughness—Nisiloy acts to eliminate hard, chilled areas . . . thus, the casting is thoroughly machinable in thin and thick sections alike and less sensitive to breakage in machining operations and general service.

Dependable Pressure-Tightness—The sound, homogeneous structure attained by inoculating with Nisiloy results in dense cast iron that provides substantially improved pressure-tightness.

EMBLEM OF INCO SERVICE
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The International Nickel Company, Inc.
Dept. F, 67 Wall Street, New York 5, N. Y.

Please send me your booklet entitled:
"NISILOY" for GRAY IRON CASTINGS

Name.....*Title*.....

Company.....

Address.....

City.....*State*.....

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N.Y.

CROWN HILL MEANS *Quality* SEACOAL

CROWN HILL SEACOAL FACING
100 LBS.
CB-GRADE
CROWN HILL
SEACOAL FACING
"CROWN HILL MEANS QUALITY SEACOAL"
MANUFACTURED ONLY BY
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND, OHIO
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CROWN HILL SEACOAL

FIGURES FROM BUREAU OF MINES, DEPT. OF INTERIOR OF THE U. S.

(Moisture Free)

PROXIMATE ANALYSIS	
Volatile Matter	38.9%
Fixed Carbon	57.4%
Ash	3.7%
	100.0%

ULTIMATE ANALYSIS	
Hydrogen	5.4%
Carbon	82.0%
Nitrogen	1.6%
Oxygen	6.6%
Sulphur	.7%
Ash	3.7%
	100.0%

Fusion Point of Ash 2980° F

The quick-flash coal used in producing CROWN HILL comes from the heart of the West Virginia bituminous coal region.

This top quality coal is carefully pulverized and screened into seven different grades. So, you're sure to find a grade to meet your particular requirements. Its quick combustibility induces faster escape of gas and steam. For lower cleaning costs and better finish—always specify CROWN HILL.

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 EAST 71st STREET, CLEVELAND 5, OHIO

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NOVEMBER 1951

FOUNDRY

VOLUME 79—NUMBER 11

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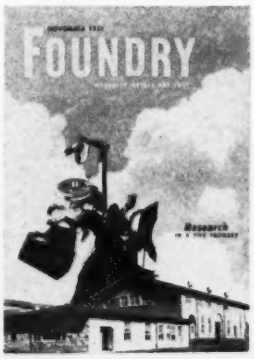
Member: Controlled Circulation Audit Inc., National Business Publications, Inc., National Association of Magazine Publishers, and Society of Business Magazine Editors. Copyright 1951 by THE PENTON PUBLISHING CO. FOUNDRY is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18.

Entered as second class matter at postoffice at Cleveland, Ohio, under act of March 3, 1879.



THE COVER: The projection microscope is one of many instruments used in research and development work by the United States Pipe & Foundry Co., Burlington, N.J.

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These bell-housing cores, blown directly on the dryer, now bake completely in only one trip through the oven. (90 minutes, load to unload.)

24 inch bell-housing cores are too large for tower oven shelves. They're baked through in a stationary oven for 2½ hours. Neenah Foundry uses INDUCTOL for all their cores.

INDUCTOL

THE "PRE-BAKED" CORE OIL

Boosts Production...

Licks Core Room Bottlenecks at Neenah Foundry Co.

See Your Linoil Man About INDUCTOL

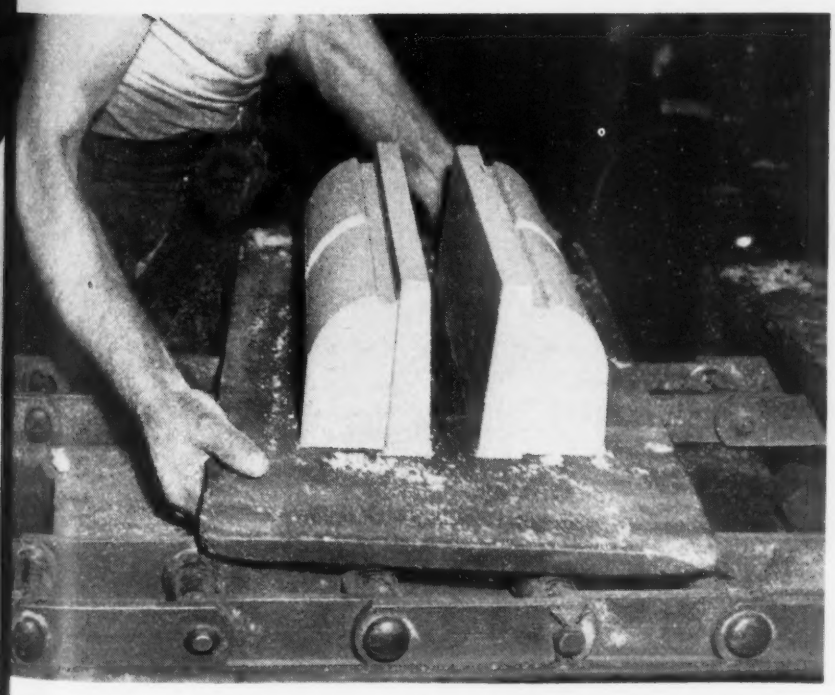
Write today for your copy of Bulletin No. 108. It's all about INDUCTOL the "pre-baked" core oil. It's factual—contains useful data that every core room should have.

✓CHECK these facts against your present core oil performance—Then investigate INDUCTOL

Faster Baking INDUCTOL is winning speedy acceptance in foundries all over the country. One of the most outstanding is the job it's doing for the Neenah Foundry Company in Neenah, Wisconsin. Here INDUCTOL mixtures are used on both blower and bench-made cores. These cores are baked in both an oil-fired tower oven and in batch-type ovens. The many advantages that INDUCTOL offers over conventional core oils are evidenced by this typical performance record.

- ✓ **BAKING TIME CUT 50%**—in both tower and "Batch-type" ovens.
- ✓ **OVEN TEMPERATURE REDUCED 40°**—cores were as thoroughly baked at 440° as at 480°.
- ✓ **37.5% MORE OVEN SPACE**—15 feet per hour increase in oven speed.
- ✓ **CORE SCRAP REDUCED 20%**—better workability, blowability, bakeability and collapsibility.

ASK YOUR LINOIL MAN ABOUT
INDUCTOL



Made with INDUCTOL, these block cores baked thoroughly in just 78 minutes at 440°F.

Neenah Foundry reports many other advantages introduced by INDUCTOL. Why not have a Linoil Man tell you the story first-hand, or better still, arrange for a demonstration or a trial run in your core room.

ARCHER • DANIELS • MIDLAND COMPANY

(FOUNDRY PRODUCTS DIVISION) • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

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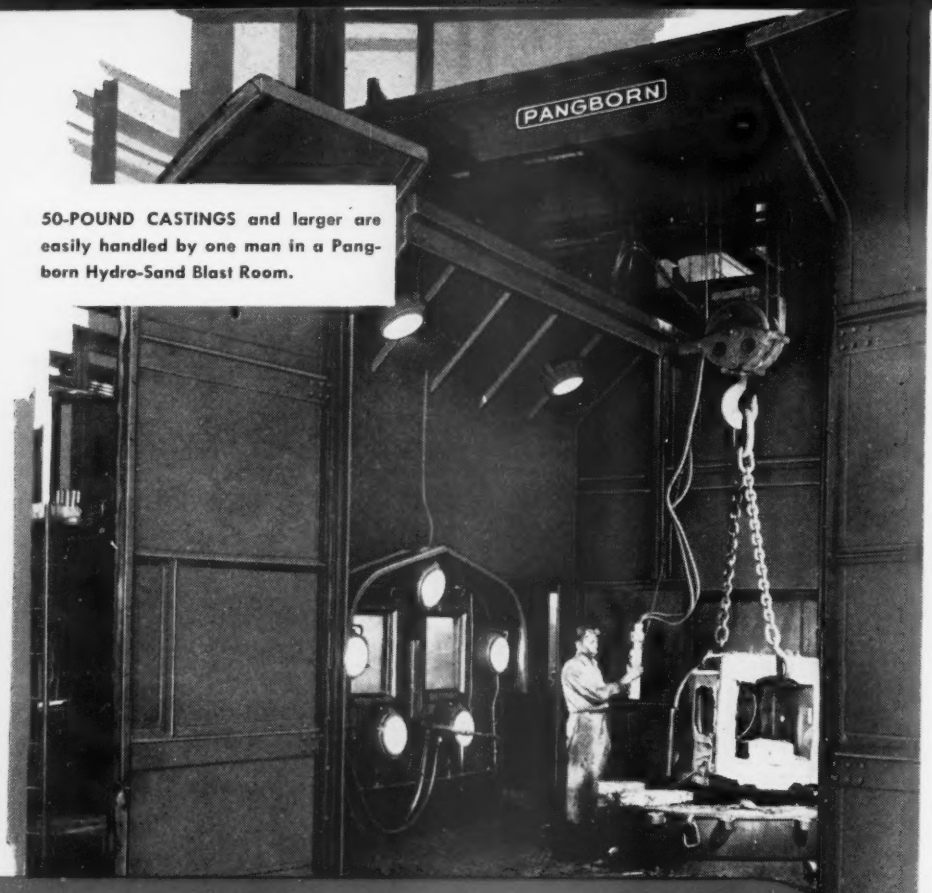
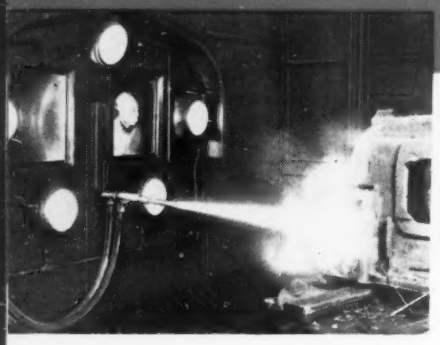


50-POUND CASTINGS and larger are easily handled by one man in a Pangborn Hydro-Sand Blast Room.

Get Pangborn Hydro-Sand Blast for

HIGH SPEED BLAST CLEANING AND CORE REMOVAL



TO speed cleaning, both core removal and blast cleaning are combined *in one operation* by Pangborn Hydro-Sand Blast. Only one operator is needed, and both the blast stream (sand and water) and rotation of the table are controlled from outside the room.

Water keeps windows clean of dirt and grime. There's plenty of brilliant illumination from spotlights aimed at the work. Swing-back ceilings and wide, seal-tight door prevent escape of dust and dirt. And core sand is recovered and core rods reclaimed without sledge damage.

Pangborn Hydro-Sand Blast saves you time and money by reducing cleaning time. You save on labor too, because subsequent roughing and chipping operations are faster and easier to perform.

WRITE FOR BULLETIN 1110. Contains full details and specifications on Hydro-Sand Blast Rooms. Address: Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

If you haven't heard it . . . IT'S NEWS!

THE WORLD WAS CREATED IN SIX DAYS but of course that was before the Russians had the veto.

* * *

FOR A SHORT WINTER, just sign a note this fall payable next spring.

* * *

PSYCHIATRISTS operate under the theory that talking will cure a lot of our troubles, but we think they have it backwards—talking probably caused most of them in the first place.

* * *

IF YOU ARE AN AVERAGE AMERICAN with a small income and a baby, it will cost you about $21,500 to raise the child from cradle to college age. This authoritative guesstimate is based on December 1950 price levels for a family with a current annual income of about $5,000. (Who says the best things in life are free?)

* * *

EVER NOTICE how it takes a lot longer to get over an illness if compensation sets in???

* * *

ABOUT THE ONLY THING a dollar will buy more of today than a year ago is advice on how to stop inflation.

* * *

SURE, THE COST OF PANGBORN PRODUCTS has gone up in price like everything else. But when you install one of our Pangborn blast cleaning or dust control machines these days, it's a better deal than ever. For modern blast cleaning and dust control will increase your output per man-hour—and a man-hour costs you more today than ever before. Besides this there are many other dollars-and-cents savings for you in a modern cleaning room set-up. Write for details today.

* * *

A WESTERN SHERIFF recently confiscated a bunch of slot machines on the basis of a law banning the use of steel traps for catching dumb animals.

* * *

SOME PEOPLE who think they are dreamers are just sleepers.

* * *

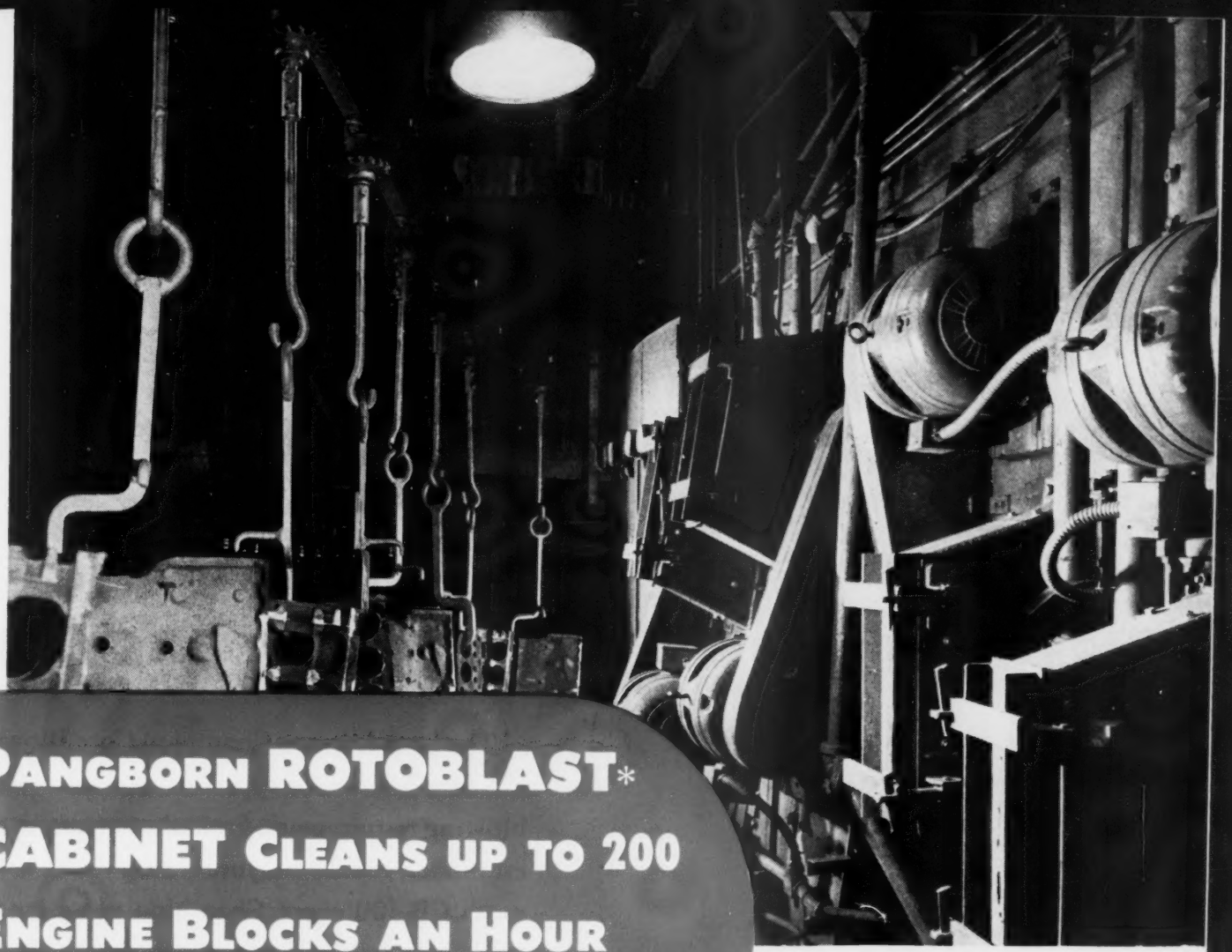
WHENEVER YOU GET FEELING too big for your breeches, you might ponder the sobering fact that what you think represents just about one two-billionth of the opinion of the world.

* * *

AN OLD TIMER is anybody who remembers when it cost more to operate a car than to park it.

* * *

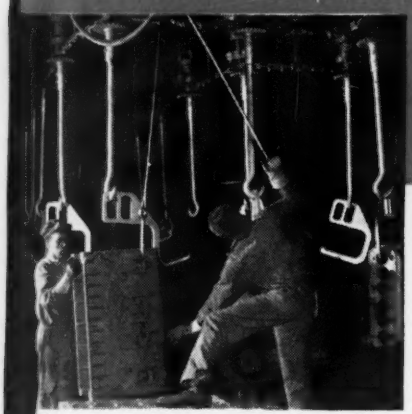
IT'S A GOOD THING TO GET IN AND DIG but be mighty careful which way you throw the dirt.



PANGBORN ROTOBLAST* CABINET CLEANS UP TO 200 ENGINE BLOCKS AN HOUR

at world's largest independent jobbing foundry

ABOVE: This rear view of Campbell, Wyant, Cannon's Pangborn "ES" ROTOBLAST Cabinet shows the conveyor system and four ROTOBLAST Machines. Inside the cabinet, the conveyor stops in front of each ROTOBLAST unit and slowly revolves the casting in the blast stream to assure complete cleaning.



Loading the heavy cylinder blocks on the conveyor is easily handled by two men.

BLAST CLEANING at Campbell, Wyant, Cannon Foundry Co., of Muskegon, Mich., is fast, efficient and *mechanized!* And the secret of this performance is two Pangborn "ES" ROTOBLAST Cabinets like that shown above. Heavy engine blocks can be cleaned at a rate of *200 an hour* . . . and cleaning is automatic! The result is faster, better, cheaper blast cleaning than ever experienced with other equipment.

Campbell, Wyant, Cannon started to mechanize their cleaning operation in 1937 . . . when they installed one of the first Pangborn monorail ROTOBLAST Cabinets. Later they installed a second Cabinet to meet production demands. As a result cleaning costs have been even further reduced, and there's no cleaning room bottleneck. Cleaning is a simple, automatic operation with high-quality work assured.

GET THE COMPLETE ROTOBLAST STORY: Bulletin 214 is informative and covers many applications. Write for your free copy to: Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

ROTOBLAST . . .

SAVES LABOR with push-button operation
SAVES SPACE because machines are compact
SAVES TIME by cleaning more loads per day
SAVES POWER since no compressor is needed
SAVES TOOLS because all scale is removed

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment.

Pangborn

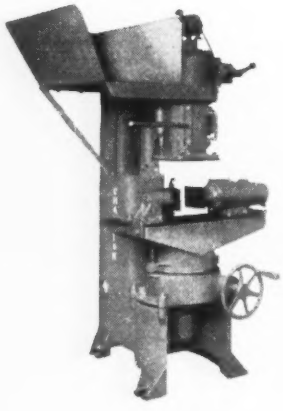
BLAST CLEANS CHEAPER

with the right equipment for every job

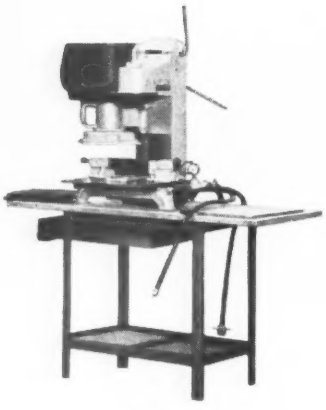
KEEP IN THE BIDDING . . .

"Championize"

and sell

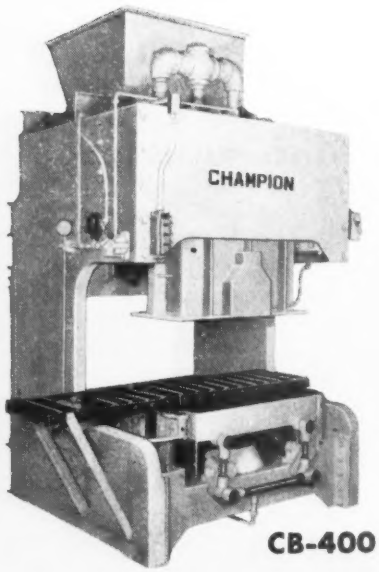


CB-10

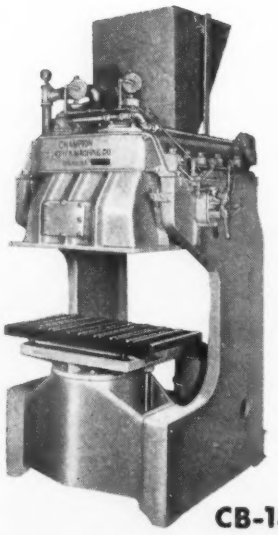


CB-5

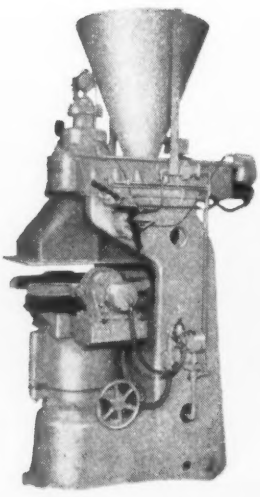
The broad line of Champion Core Blowers includes a size and type for your every core blowing requirement. From the newest, smallest model, the CB-5 (Junior) up to the mammoth CB-400 every Champion possesses the same safe, simple, speedy operation . . . the same distinctive blow valve that assures a perfect core in a fraction of a second with the standard air pressure of 85 to 100 pounds.



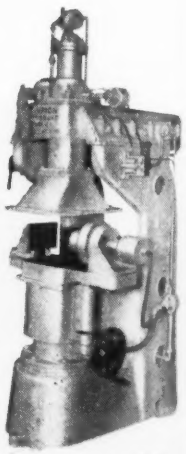
CB-400



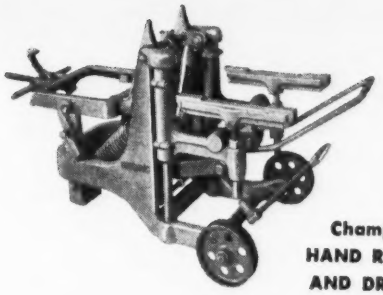
CB-18



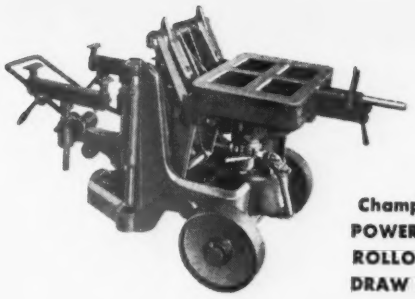
CB-15



CB-12



Champion Type W.
HAND RAM, ROLLOVER
AND DRAW MACHINE

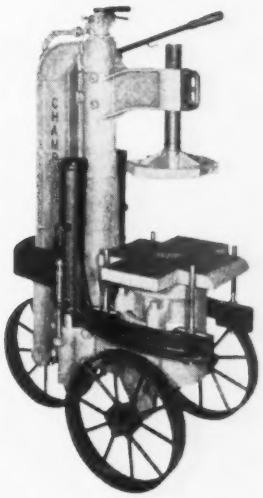


Champion Type JM
POWER JOLT, HAND
ROLLOVER AND
DRAW MACHINE

YOUR FOUNDRY

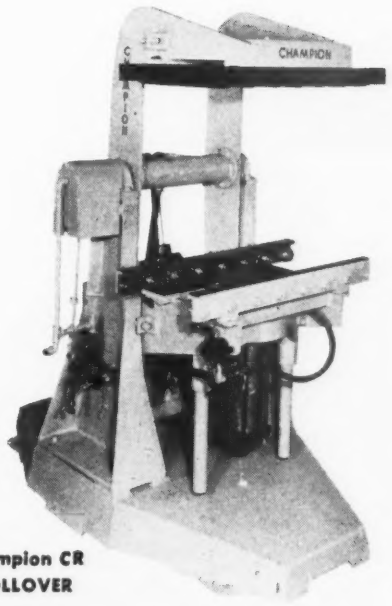
better castings at lower prices

Leading foundries that use Champion Core Blowers and molding machines to produce better castings at lower costs have the greatest possible sales advantage of marketing higher quality castings at lower prices. It'll pay you to Championize your foundry . . . to maintain full control over the quality and cost of your production.



Champion Type JSL
JOLT SQUEEZE
PIN LIFT

Champion Rollover and Draw Machines and Jolt Squeezers are designed to give you maximum service and efficiency. Let us show you how Champion equipment can fit perfectly into your foundry production picture.



Champion CR
ROLLOVER

CHAMPION FOUNDRY AND MACHINE COMPANY

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MOLDING MACHINES CORE BLOWERS THE ELECTRIC RIDDLE

ENGINEERED BELTING CUTS COSTS 50%

■Ten years ago an Eastern foundry tried and discarded four different types of conveyor belting. Extremely hot core sand made replacements frequent and expensive. An Imperial Belting engineer analyzed the operating conditions and recommended Imperial's INSULATED SAHARA, a belting manufactured especially for carrying hot, abrasive materials. Insulated SAHARA outlasted all belts previously tried by 2 to 1. Since 1939 no other brand of belting has been used.

Unexcelled for Hot Materials

Made of 37½ ounce tight woven duck combined with asbestos and special insulating material and then impregnated. Insulated Sahara handles materials from 300° F. to 450° F.; Super-Insulated Sahara, from 450° F. to 600° F. Imperial's double-stitched, Inner-Locked construction positively prevents ply separation.

Write for Data Sheet 47-8 and prices.

IMPERIAL BELTING CO.

1755 S. Kilbourn Ave., Chicago 23, Ill.

Imperial
INNER-LOCKED
BELTING
Engineered Belting—
The Right Belt for Each Job

With the EDITORS

PINCH-HITTING: When in the course of human events the proprieties demand that an editor duck a difficult or embarrassing assignment, there is always one sure way out. That "out" is the device known as the "guest editor." In this instance, the editor who usually conducts this monthly chat with the readers of FOUNDRY, and who incidentally initials it "F.G.S.," is in the predicament of being the subject of a good story. Obviously, as modest a person as F.G.S. cannot tell a story on himself. To save him from embarrassment, your present pinch-hitting or guest writer will attempt to tell the story as it should be told.

Story of an Orchid: The scene is a meeting room in The Homestead at Hot Springs, W. Va. The time: Sept. 25, 1951. The occasion: Fall meeting of the Steel Founders' Society of America. The speaker: F. Kermit Donaldson, executive vice president of the society.

Mr. Donaldson rose to his feet and addressed the audience: "I'd like to ask your attention, gentlemen, while I digress from the scheduled program. What I want to say is said at the direct suggestion of our board of directors."

Whereupon Mr. Donaldson went into a sequence of tongue-in-cheek definitions (daffy-nitions, he called them), as follows:

"Castings: A term loosely applied to parts made by letting metal solidify tightly in a mold; the basis of a long-standing feud between two groups known as designers and foundrymen.

"Foundryman: An unhappy citizen who continually seeks additional work, even though his costs often exceed his price and his plant is partly shut down for repairs; or, according to some designers, one who gropes or founders.

"Designer: A man with ideas who refuses to let production realities defeat them; one who places meaningless words on engineering drawings; and, an engineer disguised as a prima donna.

"Engineer: An underpaid, poorly dressed, ill-spoken, socially frowned-upon character without whom nothing of material importance could be accomplished today.

"Metallurgist: A technological sport, produced by crossing a physical chemist with a mechanical engineer; a man employed to reconcile the conflicting errors of designers and production men; one who attempts to define the word 'hardenability.'

"The Reliable Source: Merely the fellow you just met; the *expert* who is just an ordinary guy more than 50 miles from home."

Up to this point, F.G.S., sitting in the audience, had been attentive because he felt that some of Mr. Donaldson's "daffy-nitions" should be added to the gobbledygook which appeared in these pages last month. But as he listened, he noted that the speaker was assuming a more serious tone. Mr. Donaldson continued:

"We have among us a familiar figure who certainly qualifies as both a *reliable source* and a practicing *expert* by any definition you may choose to apply. He happens to be an inspiring individual and an exceptional editor. This calls for one final definition, which in this case is phrased in utter factuality, seriousness and sincerity.

"Among national professional groups concerned with problems of editing and publishing and establishment of high standards of practice, service and reliability, none perhaps is more important than the Society of Business Magazine Editors. Its members subscribe to a professional code of ethics, which reads in part as follows:

"I believe in and seek to practice:

"Editorial Accuracy. With reader interest as the paramount responsibility, I shall report objectively facts as I find them. . . .

"Editorial Judgment. Because the publication of injudicious, unfair or untrue statements undermines honest business magazine editorial practice, I shall judge wisely the words of print.

"Editorial Service. My publication serves a fundamental purpose in stimulating the flow of goods and services . . .; therefore, I shall direct my efforts to building a fount of data for my readers. To them I devote the sum of my knowledge and the accumulated experience of the publication I edit.

"Editorial Leadership. I shall endeavor to stimulate my readers to constructive thought and action on vital issues affecting them so that my magazine may bring enlightened leadership in its field.

"That is the code and, in effect, the hallmark of the distinguished business editor.

"One man, more than any other directly related to our industry's fields of interest, stands as the personifica-

(*Concluded on page* 12)

When you put them together

you get a picture of

BETTER CORES!

MATCHING CORE OIL TO SAND WITH THE AID OF HOUGHTON RESEARCH

The right sand and oil combination is one of the factors that result in sound, accurate castings. Houghton research has developed data showing how varying sands work best with certain types of core oils. Laboratory aid like this is yours at any time. Ask for it freely.

SELECTING THE HOUGHTON HY-TEN CORE OIL PROMISING BEST RESULTS

One of our cost-cutting core oils will team up with your production perfectly — or we'll develop a formula that *will!* The rigidly-controlled uniformity and built-in merits of all Hy-Ten Core Oils make it possible to produce better work with fewer rejects regardless of baking temperature used.

OBTAINING EXPERIENCED TECHNICAL ADVICE ON VARIOUS APPLICATIONS

One of Houghton's foundry technicians with long experience will check your foundry procedure from core bench to casting. Using your sand, under your own foundry conditions, he will show you how to get higher efficiency by standardizing on one Hy-Ten Core Oil instead of using a variety of binders.

GETTING SERVICE CONSIDERATE OF YOUR FOUNDRY'S OWN PROBLEMS

Whenever the Houghton Man calls at your plant he's there to help you first of all. He either knows the solution to your foundry's core problems or knows where he can get it. He's there to sell the Houghton Line of Hy-Ten Core Oils, of course. But he knows he must *help* you first!

Hy-Ten Core Oils

Latest Hy-Ten Bulletin will be mailed promptly on request.

. . . products of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

SIMONDS
ABRASIVE CO.
grinding wheels

'Mac' gets lots of attention now

How come? By breaking a productionline bottleneck. How so? By changing over to grinding wheels of slightly different grain and grade. What wheels? Simonds Abrasive Company wheels . . . part of a complete line that may hold the answer to your needs for top production efficiency. It includes grinding wheels, mounted wheels and points, segments and abrasive grain . . . industrially proven products of Simonds Abrasive Company, a major grinding wheel producer for almost 60 years. Write for free data book and name of your nearby distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

(*Concluded from page* 10)

tion of these worthy aims and their consistent fulfillment. As editor of the only publication of broad general circulation devoted strictly to the interests of the foundry industries, he has demonstrated time and time again his good judgment and his devotion to accuracy, service and leadership.

"We know him to be a man of integrity, objectivity, aggressiveness and a high sense of responsibility. Consistently he has been a staunch supporter, an advocate and protagonist for the industry. . .modest but relentless, judicious and stimulating. . . lending the weight of his experience and knowledge to constructive thought and practical action on prime problems and vital issues.

"What is most pleasant to note is that he is still blazing a trail of enlightened leadership. . .and at the suggestion of our board of directors, gentlemen, I want to ask Frank Steinebach to put the weight on his feet. . .and to ask you—one and all—to stand up and join in a round of well-deserved applause and commendation to a fine friend and practical philosopher, scholar and gentleman, and old grad from Purdue—'Mister Foundry.'

"Gentlemen: Frank G. Steinebach, editor of FOUNDRY!"

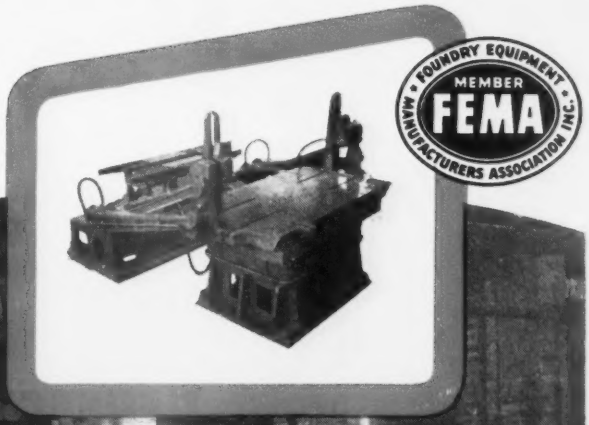
* * *

What a fine tribute from an industry to an editor! The entire business magazine fraternity is proud that the editor of FOUNDRY has received this recognition and everlastingly grateful to the board of directors and Mr. Donaldson of the Steel Founders' Society of America for the graciousness and generosity of their action.

—o—

Preview: Ordinarily members of the FOUNDRY staff have few opportunities to enjoy the world premiere of a good film. But on Sept. 7 most of the personnel of the editorial, advertising and circulation departments had the good fortune to witness in our building the first public showing of "The ADM of Cores." This is an excellent sound-color film describing how to overcome the many problems incident to coremaking. It excels in clear-cut views of operations in the coreroom and of extensive work in the laboratory. FOUNDRY personnel is indebted to the Foundry Products Division of the Archer-Daniels-Midland Co. for the treat of seeing this preview and to L. P. Robinson, vice president, and Carl Shem, advertising manager, for their informative remarks regarding the picture and its production. Arrangements for the showing were handled by A. L. Klingeman of FOUNDRY.—*Earl L. Shaner, chairman, Penton Publishing Co.*

This Foundry IS A GOOD PLACE TO WORK



Hunt-Spiller Manufacturing Corp.

THIS Boston foundry, the nation's second oldest producer of ferrous castings, was started in 1810 by Cyrus Alger, of Bridgewater, Mass. It produced the first rifled cannon cast in this country and poured the 11-inch cannon in the revolving turret of the Monitor and the guns which sank the Alabama.

Today this 141-year-old foundry spreads over ten acres, and is turning out, with modern, mechanized equipment, a wide variety of quality castings for the railroad, automotive, aircraft, electronic, machine tool, paper mill, ship and pipe line industries. It is internationally famous for its tough "gun iron" for use in ordnance.

Management and labor have ample evidence that their foundry is a good place to work. 126 of its 400-odd foundry workers have over 10 years of service and a combined service record of 2935 years. Fifty-nine of its foundry employees started with the company more than 25 years ago, and not a few have 40-year and longer service records.

Safety, good-housekeeping, labor-lightening equipment, and training for workmanship are emphasized by Hunt-Spiller. It maintains a safety engineer, has an active, employee-composed safety committee, and employs two doctors and a registered nurse.

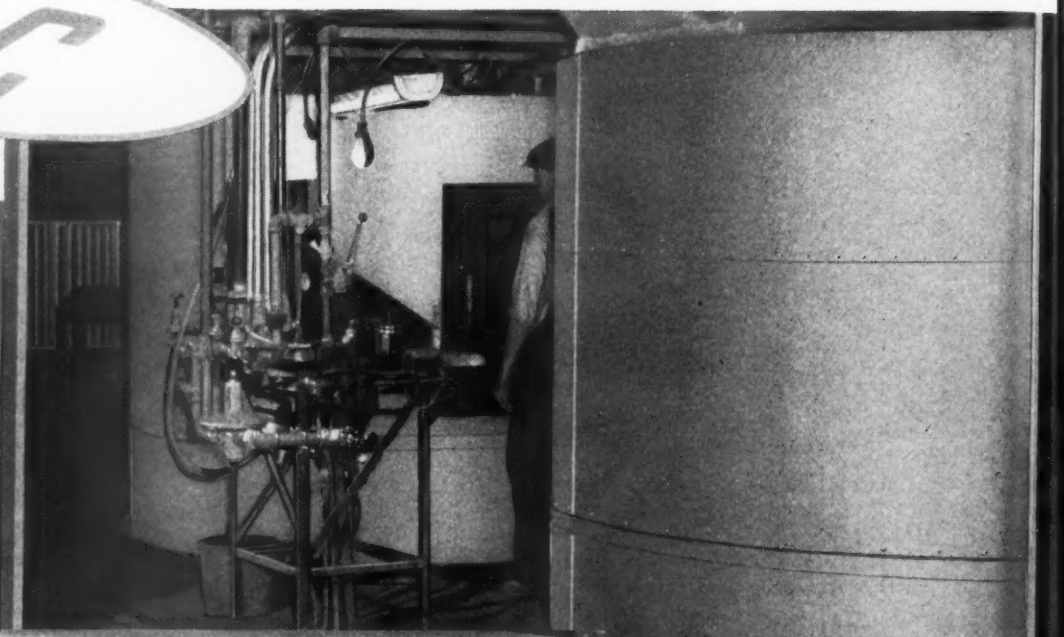
Helping to make this foundry a good place to work are several Herman Molding Machines. The 3000 lb. jarr rollover machine is typical. Like all Hermans, these machines are simple to operate. A timer controls jarring. One valve handles all operations. For further details, just write us at the address below. Herman Molding Machines, at Hunt-Spiller and other leading foundries, have made their way by the way they're made.

Herman **MOLDING MACHINES**

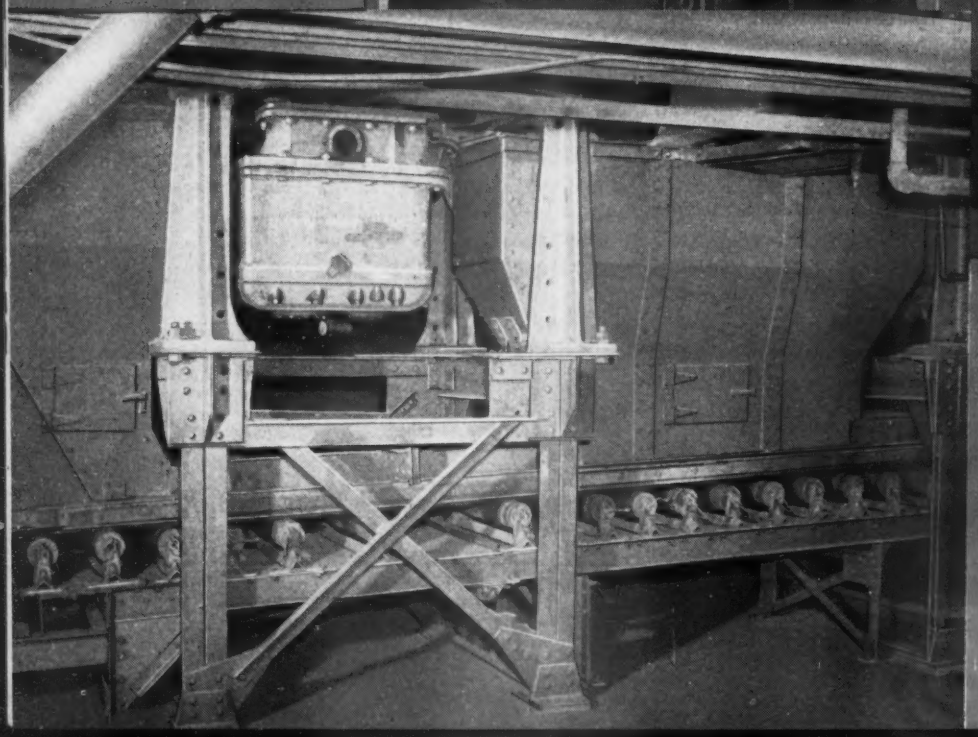
HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Perfect Circle

PERFECT CIRCLE CORPORATION
gets PERFECT sand for Piston Ring Molds
with 2 SIMPSON *Intensive* Mix-Mullers

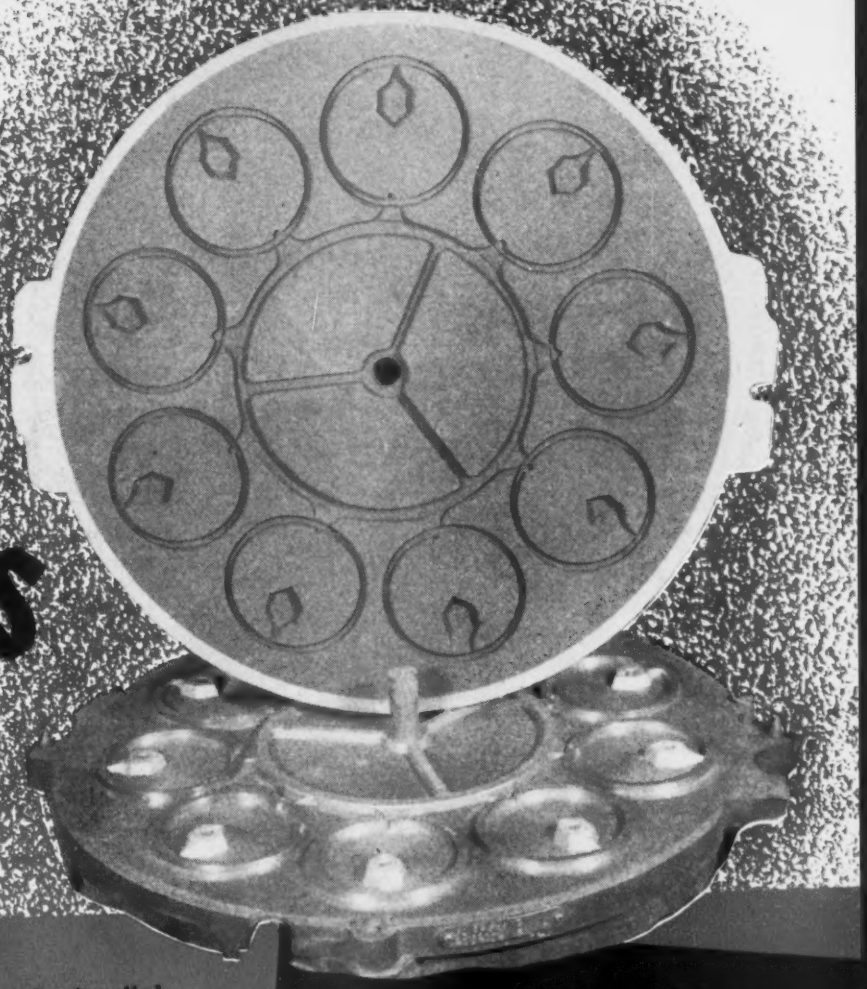


Right: Two No. 3 SIMPSON Intensive Mix-Mullers at Perfect Circle, New Castle, Indiana, turning out 90 tons/hour of carefully prepared sand.



Left: View directly below SIMPSON Intensive Mix-Mullers showing mill conveyor from which sand is elevated to distributing conveyor.

demands Perfect Castings



ELEVEN years ago the Perfect Circle Corporation installed two No. 3 SIMPSON Mix-Mullers at their New Castle, Indiana, foundry. Since the very beginning, these Mullers have consistently produced the high quality of sand so necessary to meet the rigid casting requirements of that company.

The close tolerance, the precision accuracy of Perfect Circle Piston Rings *demand* perfect castings — any defect causes a reject — even minor repairs are impossible.

Smooth, defect-free castings are only possible where molding sand is prepared with utmost care — where each sand grain is evenly coated with bond — where the moisture content is carefully controlled.

At Perfect Circle *production too* must be maintained at a high level. Here again, SIMPSON Mixers have maintained an enviable record . . . 11 years of operation *with no down time due to Mullers.*

Perfect Circle is justly proud of an efficient sand system which is operating now, as it did for 5 critical years during the war . . . 6 days a week, 22 hours a day with less than 0.03% down time per year!

Whether you are casting small piston rings or large manhole covers, the efficiency and speed of your operation — the quality of your finished product, is dependent on the preparation of your sand. Let us show you how you need not sacrifice quality to obtain top production and low maintenance with the rugged SIMPSON Mix-Muller.

Write for bulletin No. 511 on the new 2-F and 3-F *Intensive* Mullers.

Installation Highlights of two SIMPSON Intensive Mix-Mullers at Perfect Circle

- ★ Eleven years of service with no down time due to mullers.
- ★ Operating 22 hours a day 6 days a week for five consecutive years.
- ★ Presently producing 2000 tons of carefully prepared sand per day.
- ★ Only 0.4 percent make-up sand per day.

SIMPSON *Intensive* MIX-MULLERS

NATIONAL *Engineering Company*

608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents: For Continental European Countries — George Fisher, Ltd., Schaffhausen, Switzerland; for British Possessions — August's Limited, Halifax, England; for Canada — Dominion Engineering Co., Ltd., Montreal; for Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd., Sydney, for Argentina, Brazil and Uruguay E quipamentos Industriais EISA Ltda., Sao Paulo, Brazil; for Mexico — CASCO S. De R.L., Mexico, D.F.

LOWE Electric Sifter

A high quality sifter featuring g
screening area, enclosed ball b
motor, more shoveling room, rugge
struction and trouble-free ope
Saves time and money through fast
ing and better-sand conditioning.

Because the type and condition of your equipment directly affect (1) production rate and costs, (2) maintenance costs, (3) quality of product and (4) profit—the selection of equipment becomes an all-important move. It is extremely vital to the successful operation of your foundry that you use only the most modern, most efficient machines. So, when you're ready to buy equipment, make the right move—buy FEDERAL—across the board.

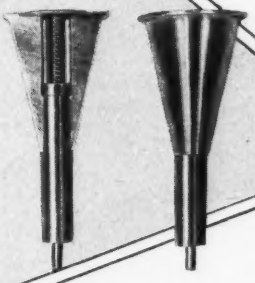
Shown here are only a few of the more than 400 items that go to make up the FEDERAL line—FEDERAL-made products that foundrymen everywhere have been using profitably for years. Call your local FEDERAL representative or write or wire for full information and prices.

FEDERAL FOUNDRY manufactures all equipment illustrated.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

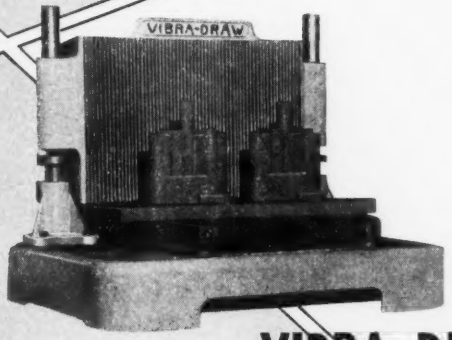
MAKE THE RIGHT MOVE

when you buy equipment...



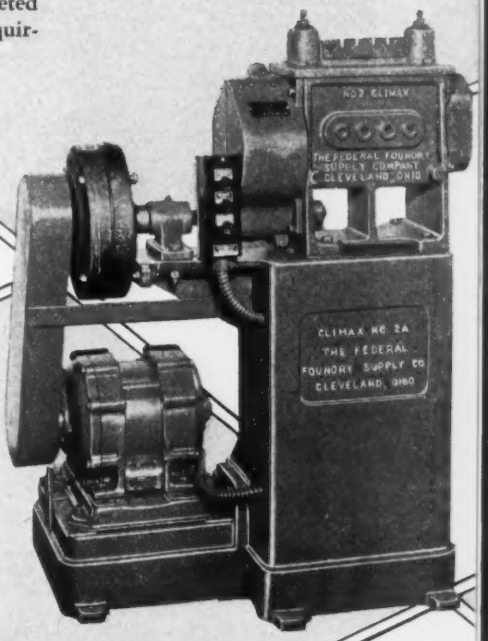
SHUR-SPOT SPRUES

For squeezer-made molds. SHUR-SPOT squeezes down with the sand. When squeezer board is removed, SHUR-SPOT pops up to be lifted out. The result is a fully completed and properly located pouring sprue, requiring no finishing.



VIBRA-DRAW

With any core blower, you make cores only as fast as you draw them. VIBRA-DRAW draws cores as fast as SAN-BLO makes them. Simply place core box against vibrating head and lift box. A perfect core every draw—and fast!

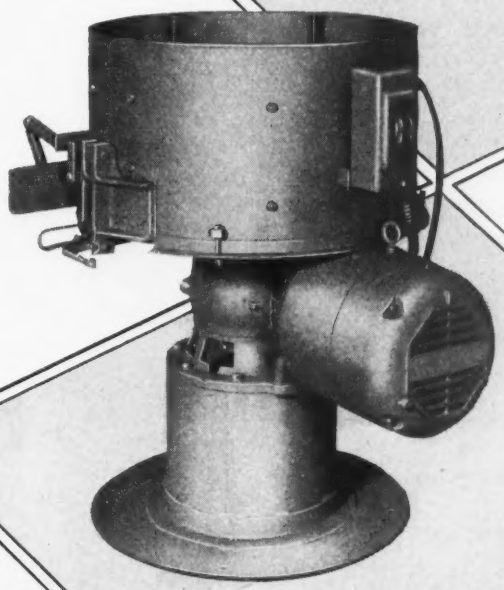


CLIMAX Wire Straightener

Wire is hard to get, so it's important that you straighten and re-use wires and rods. The CLIMAX, an old friend in many foundries, is the ideal machine for this job. Handles random lengths. Operated efficiently by unskilled labor. Wide variety of models.

SAN-BLO

The first all-purpose sand blower. Motor driven plows move sand in low head to conserve full air pressure for aerating and carrying sand into core box. Blows any sand you can hand-ram, regardless of bond strength or moisture. Blows single cores up to 40 lbs. each, or 40 lbs. of small cores, without refilling blow head. Any type box. One blow plate, one universal vent plate. The fastest, most efficient sand blower ever developed. Ideal for jobbing foundries.



WHIRLMIX Sand Mixer

The first and only mixer with flexible, whirling, rubbing arms. Produces fluffy, aerated, thoroughly mixed sand without overheating, or crushing sand grains. Small, compact, easily moved—yet a big producer, for it mixes 4,000 lbs. of sand per hour.

The FEDERAL FOUNDRY SUPPLY Company

4600 EAST 71st STREET · CLEVELAND 5, OHIO

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MAKE YOUR PRODUCTION MUSHROOM!

THIN-SHELL SAND MOLDS AND CORES GIVE YOU MORE, BETTER CASTINGS PER TON OF METAL POURED

Here are sound reasons why thin-shell sand molds and cores bonded with BAKELITE Phenolic Resins increase the yield of sound castings...

- Finer-grain sands provide well-nigh pattern smooth castings, minimizing finishing.
- High porosity of shells allows free escape of gases, virtually eliminating gas pockets. No burnt-on or burnt-in sand on metal.
- Integral guide pins and holes assure positive, accurate registration of mold halves at all times, thus eliminating the necessity for mold shift allowance.
- Tolerances of .002 to .005 inches per inch drastically cut finishing of castings.

Add to these advantages: Tamping and vibrating of sand no longer necessary, thereby extending life of patterns... ninety per cent less sand required . . . molds and cores are strong, moisture-resistant, stable, with long storage life... floor space, time and money are saved.

For complete information on BAKELITE Phenolic Resins for bonding thin-shell sand molds and cores, fill out and mail the attached coupon today.

Dept. CU-29, BAKELITE COMPANY,
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

Please mail my free copy of the Booklet K 10, "BAKELITE Phenolic Resins for Foundry Molds and Cores."

Name _____ Title _____

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PHENOLIC
BONDING RESINS
TRADE MARK

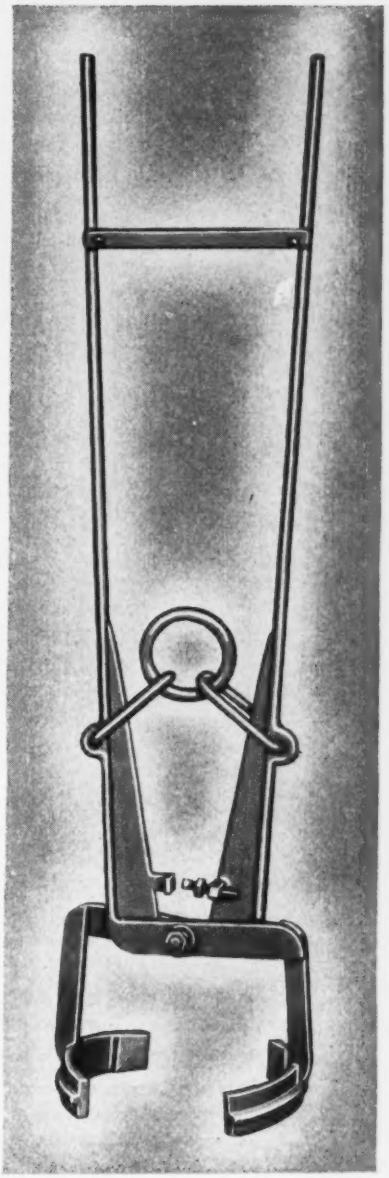
BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

NO. 1 SOURCE FOR

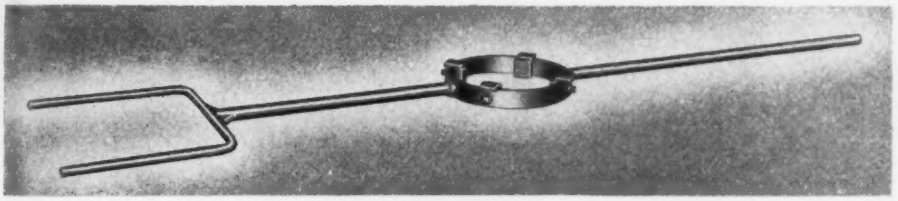
Bowls · Shanks · Tongs

Industrial Equipment round bottom pressed steel ladle bowl, 50 lb. capacity, type 7 flat side.

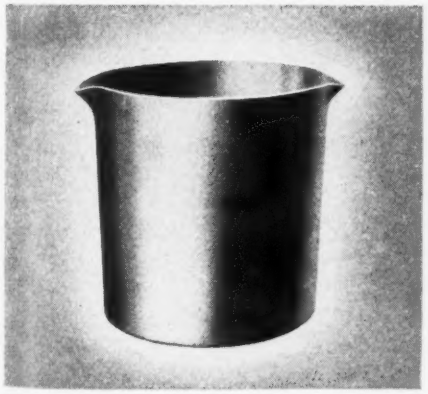
Industrial Equipment round bottom pressed steel ladle bowl, 60 lb. capacity, type 14 circular.



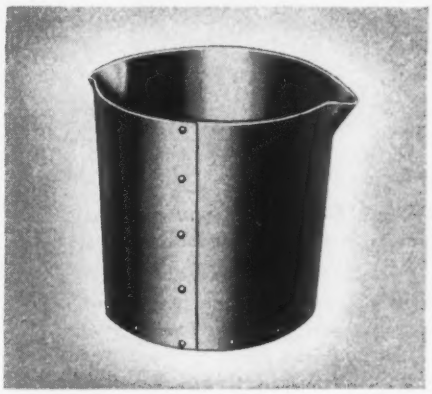
Type 72C crucible tongs. Adjustable. Four-point suspension. Claw types also available.



Industrial Equipment type 30CA single and adjustable ladle and crucible shank. Four-point suspension . . . easily adjustable . . . no springs . . . air cooled band. Fixed band types also available.



Industrial Equipment type 514 flat bottom welded steel ladle bowl. Available in almost any size or thickness.



Industrial Equipment 537 flat bottom riveted steel ladle bowl.

The above Industrial Equipment products, along with dozens of other types of bowls, shanks, tongs and ladles, are included in our latest catalog. *Write for your copy.*

LADLES

SHANKS

BOWLS

TONGS

Industrial
EQUIPMENT COMPANY
115 NORTH OHIO ST., MINSTER, OHIO

more production...less waste!

COLEMAN OVENS

Coleman Tower Oven at Forest City Foundries Co.

● **COLEMAN TOWER OVENS** produce perfectly baked cores, need less manpower, result in increased tonnages of better quality castings.

Patented open center, by increasing oven loading accessibility, improves productivity of the coremakers. Coleman Tower Ovens, using only 25% of the floor space required by batch-type ovens provide labor savings up to 75% by eliminating racks, trucks and other time-wasting handling methods.

Coleman Tower Ovens help you overcome acute labor shortages and scarcity of materials. They are vital in meeting the demand for increased casting production.

Only COLEMAN OVENS offer all these advantages:

- PERFECT DRYING AND BAKING eliminate manpower and casting losses due to make-overs and rejects.
- INCREASED PRODUCTION by making the most efficient use of skilled and unskilled labor.
- HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation, and minimum maintenance cost.
- GREATEST SAVINGS IN FUEL by using the most economical fuel available.
- MOST ECONOMICAL CORE BINDERS, oil or resin, for your particular casting requirements, can be used.

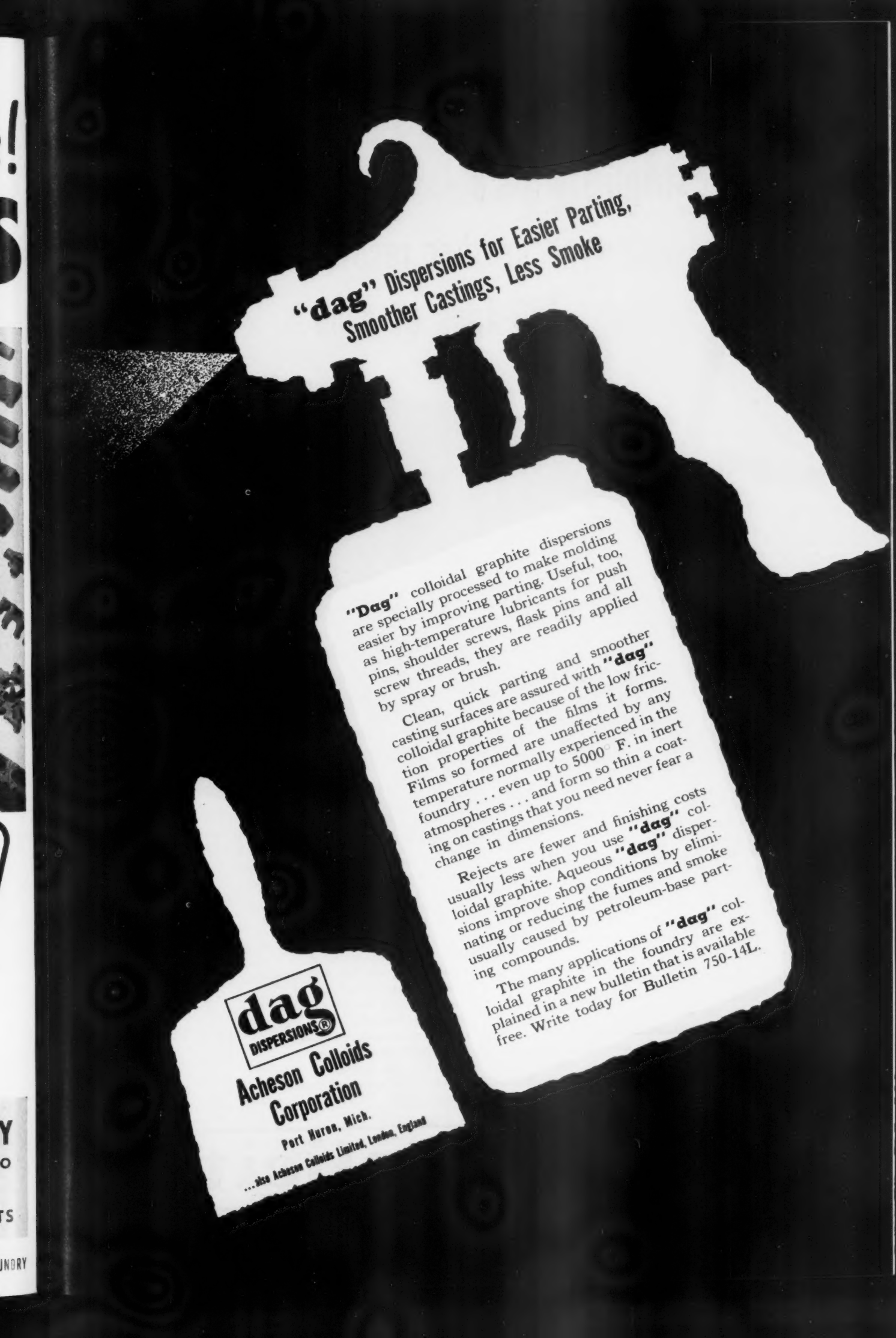
A COMPLETE RANGE OF TYPES:
COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement: Tower Ovens, Horizontal Conveyor Ovens, Car-Type Ovens, Transrack Ovens, Rolling Drawer Ovens, Portable Core Ovens, Portable Mold Dryers, etc.

THE FOUNDRY EQUIPMENT COMPANY

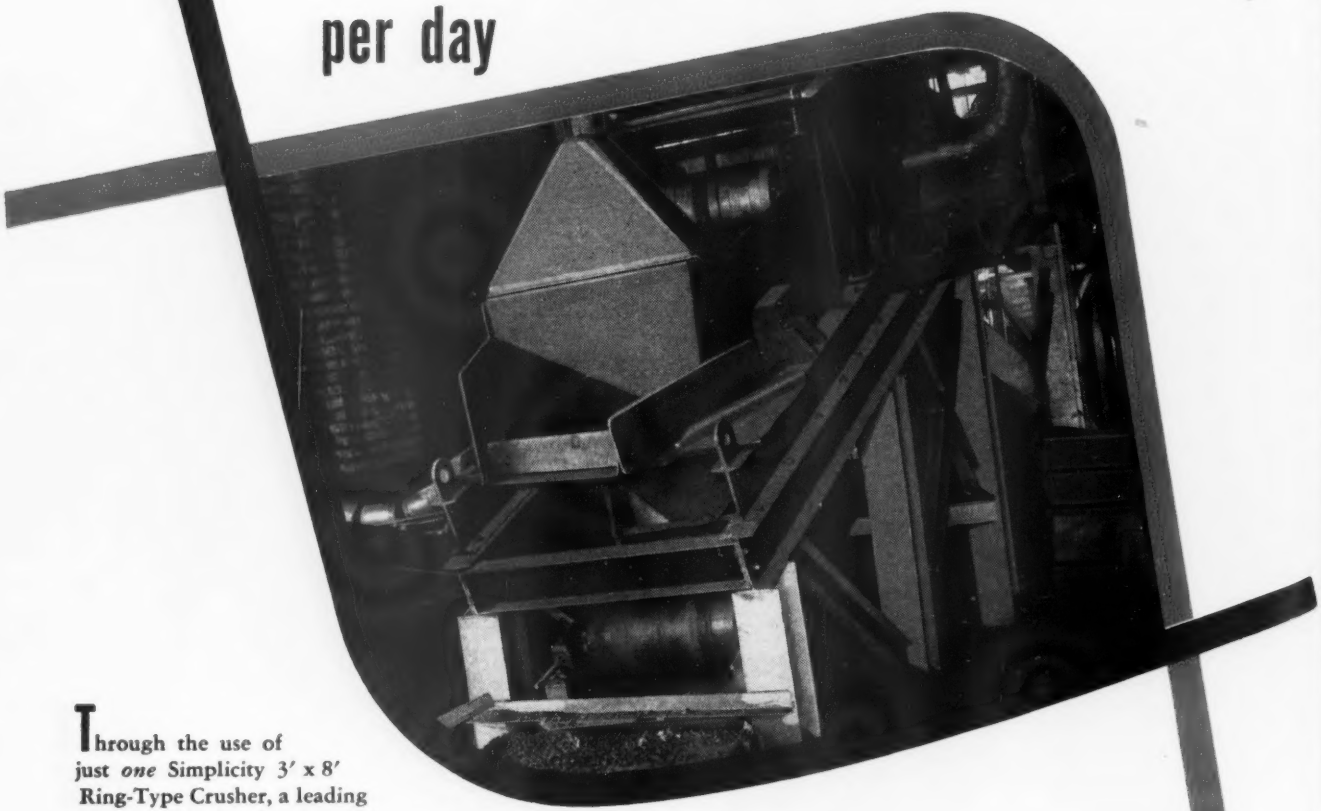
1831 COLUMBUS ROAD — CLEVELAND 13, OHIO

MEMBER FEMA

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS


"dag" Dispersions for Easier Parting, Smoother Castings, Less Smoke
"Dag" colloidal graphite dispersions are specially processed to make molding easier by improving parting. Useful, too, as high-temperature lubricants for push pins, shoulder screws, flask pins and all screw threads, they are readily applied by spray or brush.
Clean, quick parting and smoother casting surfaces are assured with "dag" colloidal graphite because of the low friction properties of the films it forms. Films so formed are unaffected by any temperature normally experienced in the foundry . . . even up to 5000° F. in inert atmospheres . . . and form so thin a coating on castings that you need never fear a change in dimensions.
Rejects are fewer and finishing costs usually less when you use "dag" colloidal graphite. Aqueous "dag" dispersions improve shop conditions by eliminating or reducing the fumes and smoke usually caused by petroleum-base parting compounds.
The many applications of "dag" colloidal graphite in the foundry are explained in a new bulletin that is available free. Write today for Bulletin 750-14L.
dag DISPERSIONS®
Acheson Colloids Corporation
Port Huron, Mich.
...also Acheson Colloids Limited, London, England

simplicity 3′ x 8′ ring-type crusher recovers about 400 tons of sand per day



Through the use of just *one* Simplicity 3′ x 8′ Ring-Type Crusher, a leading automobile manufacturer realizes savings of about 400 tons of sand daily in grey-iron foundry operations.

In this installation, lumps of sand, especially those from cores that do not break up in shakeouts or screening, are fed to the Simplicity Crushing Screen instead of being hauled to the dump, as is the practice in many foundries. The recovered sand is returned by conveyor to sand storage and mulling equipment thus making appreciable savings in new sand requirements as well as eliminating the cost of hauling away sand lumps. With a Simplicity, one unit does both crushing and screening. It gives positive crushing action and maximum production of grain-size sand. Simplicity Crushers are available with either one, two, or three sets of rings, depending on the lump size to be crushed.

Simplicity Crushing Screens are in profitable operation today in foundries producing magnesium, aluminum, steel, malleable iron, and grey iron castings . . . why not put one to work in your foundry?

A Simplicity sales engineer will be glad to give you the full story. Write us.

103

Sales representatives in all parts of the U. S. A.

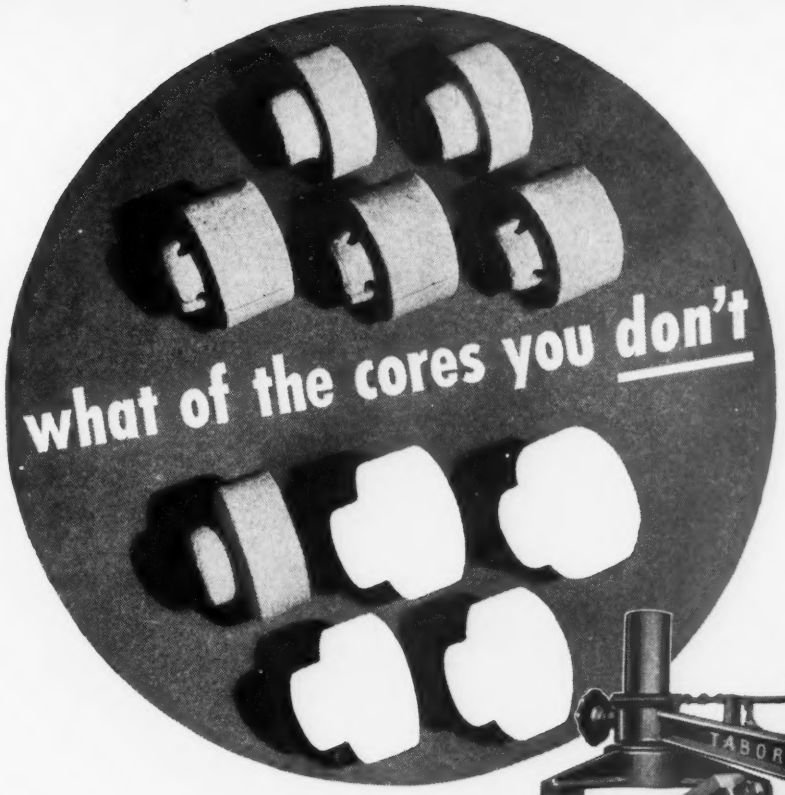
FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING CO. • DURAND, MICHIGAN

...but what of the cores you don't make?



We *mean the extra 40% production you lose*

... those additional cores that a Tabor Rollover Core Machine could turn out for you in the same time.

The reason for "upped" production of small cores with the Tabor machine lies in its design—featuring simplicity, compactness, handy control.

There's no need for the operator to walk back and forth in order to clamp, level, roll over and unclamp the core box. Instead, he saves valuable time. From *one position*—and with *one control lever*—he completes each operation, from clamping the plate to conveniently swinging out the drawn core.

The ingenious features in the Rollover Core Machine are good examples of the plus-values built into all Tabor foundry equipment. That's what comes of 62 years' experience in designing and building foundry machines that more than meet foundrymen's needs.

TWO SIZES:

4" Draw — for boxes up to 12" x 20" x 7"

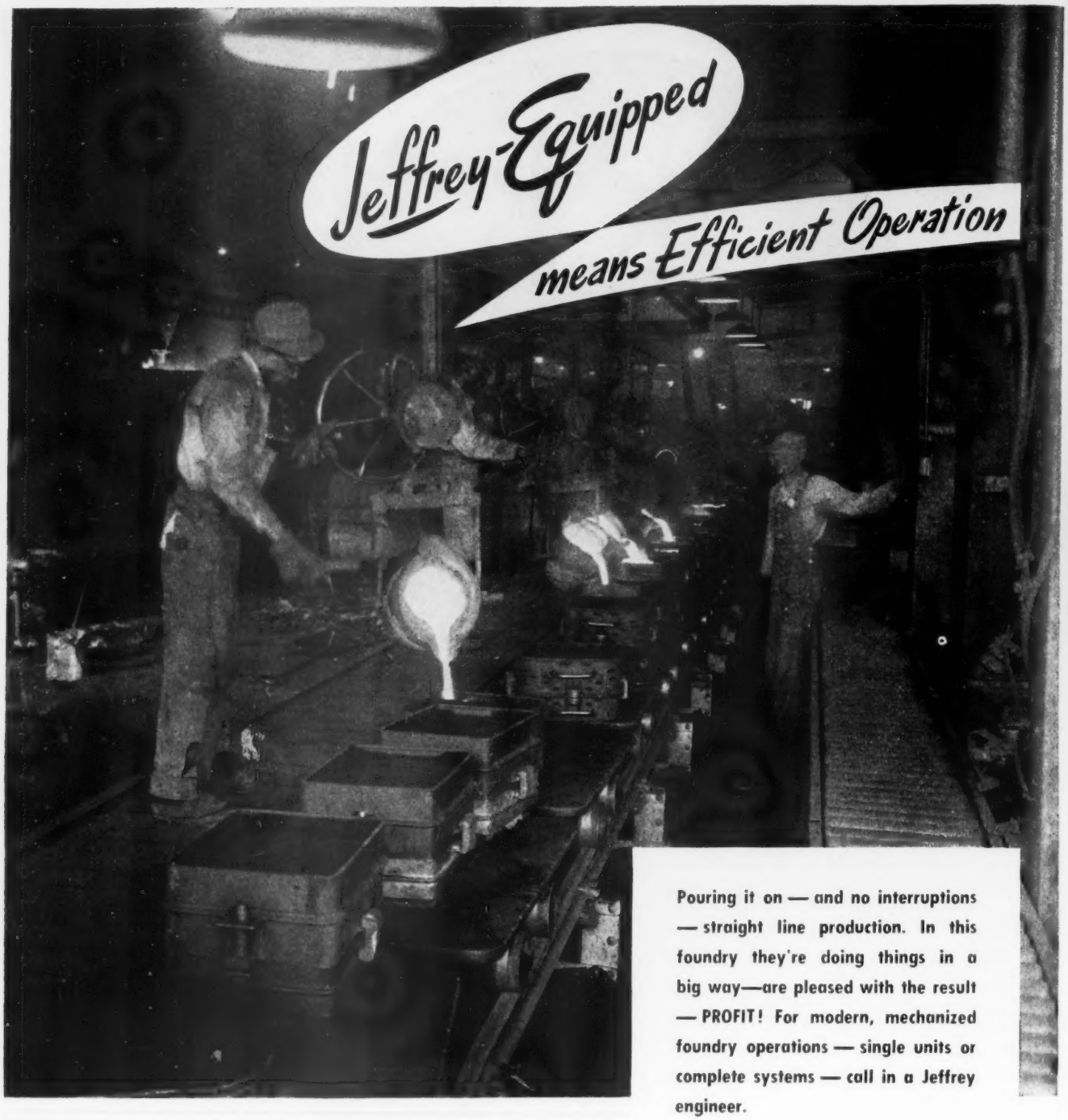
8" Draw — for boxes up to 14" x 24" x 12"

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR *Manufacturing Co.*

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.



Pouring it on — and no interruptions — straight line production. In this foundry they're doing things in a big way—are pleased with the result — PROFIT! For modern, mechanized foundry operations — single units or complete systems — call in a Jeffrey engineer.

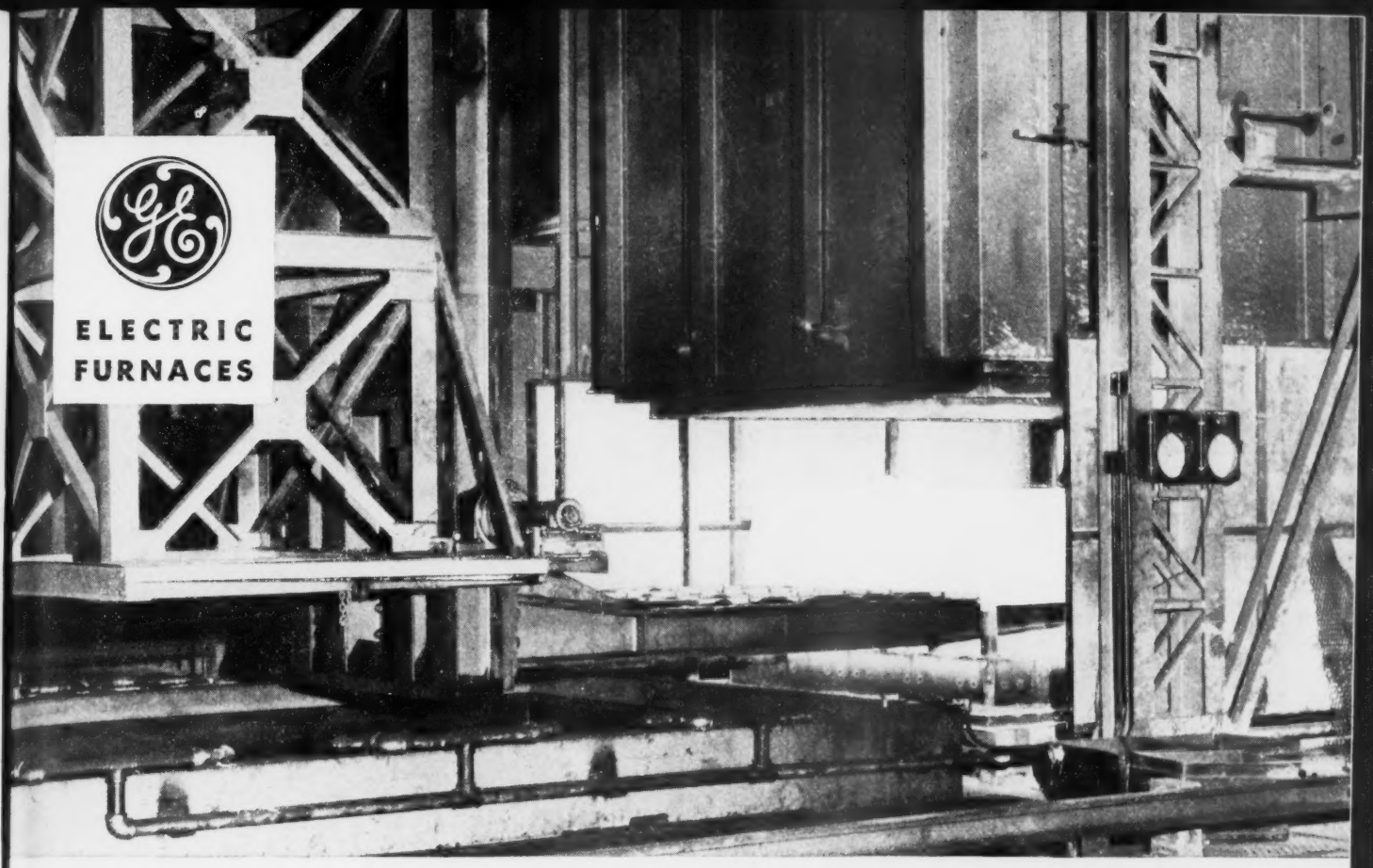
THE JEFFREY MANUFACTURING COMPANY

907 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2 · Beckley, W. Va. · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 15 · Denver 2 · Detroit 13 · Forty Fort, Pa. · Harlan, Ky. · Houston 2 · Jacksonville 2 · Milwaukee 2 · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 2 · Salt Lake City 1

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio



ANNEALED 3 TIMES AS FAST

National Malleable and Steel Casting Co., Cleveland, Ohio, cut the time cycle from *6 days to 48 hours* for annealing automotive castings with G-E electric furnaces.

IMPROVES QUALITY

- because uniform heat produces more uniformly annealed castings.
- because decarburizing is eliminated. Tight furnace construction retains the cost-free protective atmosphere generated by the castings during annealing.

CUTS COSTS

- because no auxiliary protective atmosphere equipment is needed.
- because no containers for castings are used. Castings are loaded directly on grids and placed in the furnace.
- because less power is required for heating, since packing sand and heavy containers are eliminated.

The compact, well-designed furnaces provide safer working conditions and result in cleaner, cooler operations. National is so satisfied with savings in *over-all costs* and faster production that they now have 20 more G-E furnaces on order.

WHY DON'T YOU consider these advantages and contact the G-E Apparatus Sales Office nearest you to obtain the recommendations of an Industrial Heating Specialist. Or write to: Sect. 720-42, General Electric Co., Schenectady 5, N. Y. General Electric can supply you with a complete line of electric furnaces, gas atmosphere equipment, induction and dielectric heaters and small heaters and devices.

You can put your confidence in—

GENERAL ELECTRIC

720-42

DELTA
FOUNDRY PRODUCTS
SPEED PRODUCTION OF
BETTER, CLEANER CASTINGS
AT *Lower Cost*

CORE AND MOLD WASHES:

FOR STEEL:

Delta Special Core & Mold Wash Base — Used by more steel foundries than all other types of washes combined.

Delta SteelKoat — a finished high fusion waterproof wash.

FOR ALL TYPES OF SAND CAST METALS:

Delta ThermoKoat — It's plasti-lastic, non-heat shocking, highest fusion and hot strength.

Delta Z-Koat — a zirconium wash with unusual properties in contact with molten metal.

FOR GRAY IRON, MALLEABLE, BRONZE AND BRASS:

Delta GraKoat — no reaction with molten metal.

Delta BlacKoat — a black wash, free from carbon, no gas in contact with molten metal.

FOR GRAY IRON:

Delta BlacKoat S-5 — a new and different wash. Produces results, on gray iron castings, unequalled by any other wash.

FOR NON-FERROUS AND LIGHT METALS:

Delta NonferrusKoat — produces unusually smooth surface castings.

PARTING COMPOUNDS:

Delta Partex — (Nutshell partings) has lycopodium properties, non-injurious and non-hazardous to use.

Delta Liquid Parting — Low-cost, highly effective and lasting.

MUDDING & PATCHING COMPOUNDS:

Delta Sliktite — a light colored mud for all types of metal castings.

Delta Ebony — a black mud for gray iron, malleable and nonferrous work. All mudding compounds seal core joints and hold joints together at high temperatures.

NO-VEIN COMPOUND:

A special compound, not iron oxide. A high hot strength and sand plasticizing material. Stops veins and penetration.

MOLD SURFACE BINDERS—LIQUID:

Delta Spray Binders — Produce dry sand mold results by surface spraying of green sand molds.

PERMI-BOND:

Eliminates Sea Coal Nuisance: The new modern scientific sea coal replacement.

DRI-BOND:

A new type of Dry Binder which provides new economies. Fast-baking, reduces veining and penetration. Can be used with old sand equally as well as with new sand.

BONDITE: Produces a reducing mold atmosphere:

For Steel and Gray Iron — Use Delta Bondite, a dry binder which becomes waterproof on drying and produces mold atmosphere which is high in reducing gas.

96-B SAND RELEASE AGENT:

Another Foundry *"First"* by Delta. By adding 8 oz. or less per ton to your core or molding sand mixes, your sands will flow freely. 96-B is completely volatile at elevated temperatures and does not contaminate the sand.

CORE ROD DIP OIL NO. 224X:

Ties core rods and wires into the cores:
Rods and wires coated with Delta Core Rod Dip Oil adhere to the sand. Eliminates need for 50% of the rods and wires and reduces core breakage.

DELTA SAND CONDITIONING OIL:

Sticking core sand mixes work freely in core boxes when sand conditioning oil is added to core sand mixers.

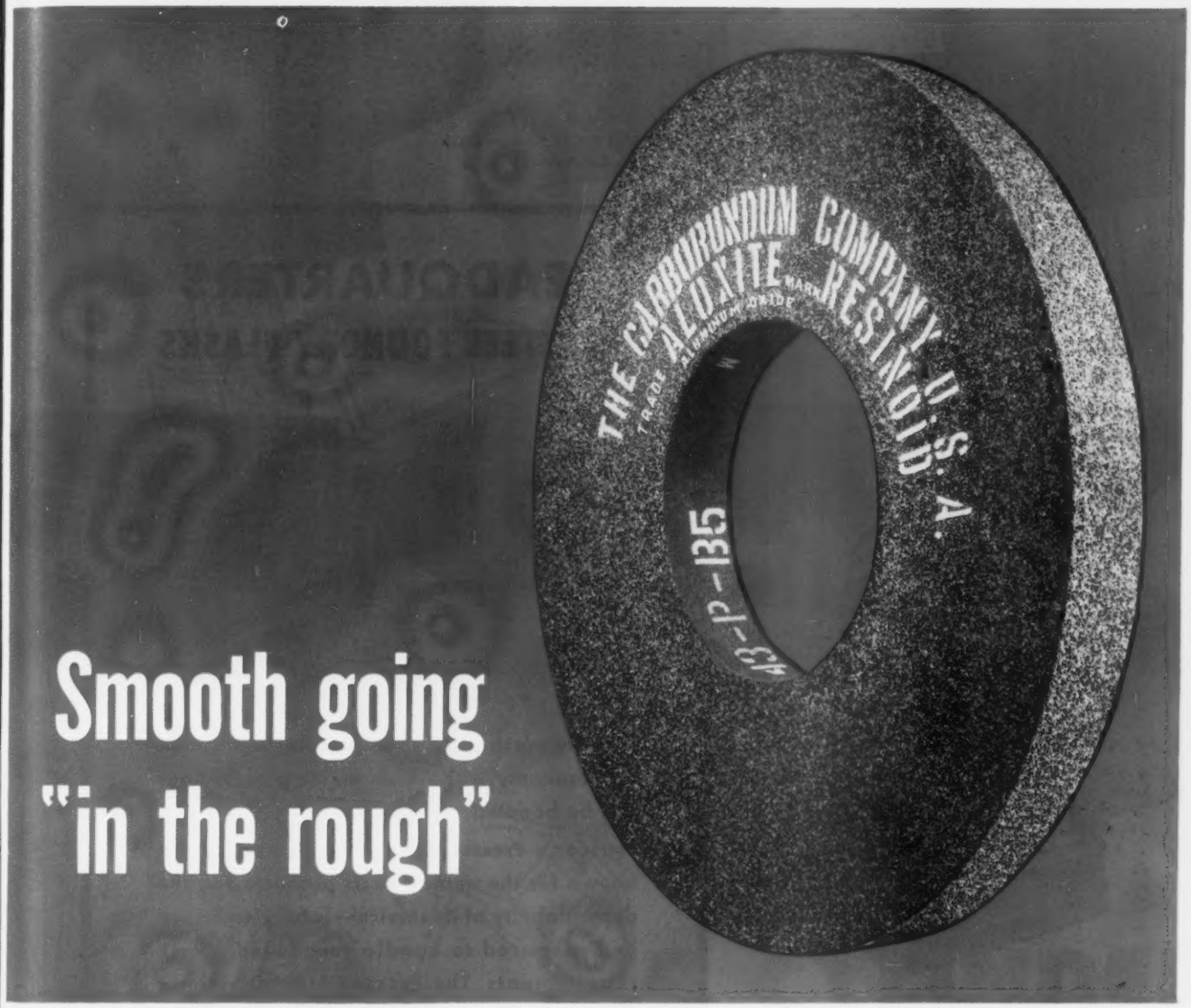
CORE OILS:

High tensile, low gas, faster baking, exceptionally economical to use.

Get the Facts...

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA OIL PRODUCTS CO.
MILWAUKEE 9, WISCONSIN



Smooth going "in the rough"

You'll keep castings moving faster through the cleaning room when you use B5 and B7N resinoid bond wheels by CARBORUNDUM for rough grinding. These dependable snagging wheels maintain a consistent high cutting rate throughout extended wheel life. Greater wheel strength gives added resistance to mechanical and heat shock.

For more productive, *safer* operation—even in severest service—use B5 and B7N snagging wheels by CARBORUNDUM. Your CARBORUNDUM salesman or distributor can supply you. Or write Dept. F 81-32.

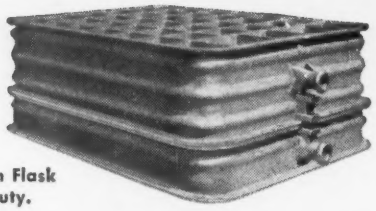
Only CARBORUNDUM

TRADE MARK

makes ALL Abrasive Products ...to give you the proper ONE

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, N.Y.

Model CH-20 Truscon
Power Handled Flask.



Model CH-40 Truscon Flask
for Extra Heavy Duty.

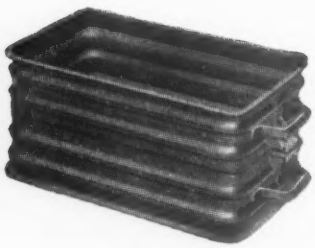
HEADQUARTERS
FOR STEEL FOUNDRY FLASKS

THE SUCCESS of modern foundry methods depends upon the speed and economy with which molding operations can be handled.

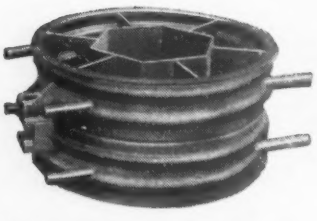
Truscon's Pressed Steel Division—nationally known for the quality of its products and the dependability of its service—is fully equipped and prepared to handle your foundry flask requirements. The Pressed Steel Division's central location assures efficient service for your needs. Write for free catalog describing the complete line of Truscon Steel Foundry Flasks.

TRUSCON
STEEL COMPANY
PRESSED STEEL DIVISION
6100 TRUSCON AVE. • CLEVELAND 4, OHIO
Subsidiary of Republic Steel Corporation

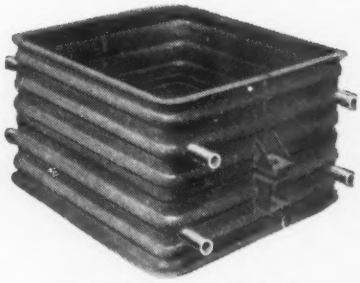
Model OM-1 Truscon Flask
for One-Man Handling.



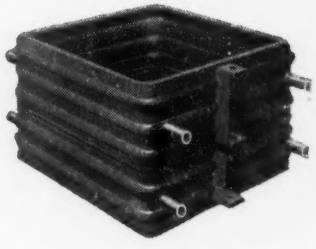
Model OM-4 Truscon Flask
for One-Man Handling.



Model TMR-60 Round Truscon Steel
Flask for Two-Man Handling.



Model TM-10 Truscon Flask
for Two-Man Handling.



Model TM-12 Truscon Flask
for Two-Man Handling.

SOLID STEEL HEADS, CAPS and MOUNTINGS MACHINED from SOLID BAR STOCK
HARD CHROME PLATED PISTON RODS
DIRT WIPER SEALS
NON-CORROSIVE BRASS BARRELS
Miller
TRADE MARK REGISTERED

AIR CYLINDERS

Meet J. I. C. PNEUMATIC STANDARDS...

(Write for FREE copy of these "Standards")

The four features illustrated above serve to show how Miller Air Cylinders *for years* have been meeting—*even exceeding*—the high quality set by the recently adopted J. I. C. Pneumatic Standards for Industrial Equipment. See for yourself! . . . write for our free bulletin A-105 and receive also your own *free* personal unabridged copy of these "Standards" with standard symbols, sample circuit, interesting point-by-point comparison—all neatly compiled into a handy booklet that fits your reference file and folds to fit your pocket.

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

Benefits to You

No Broken Castings
No Scratch-Damage to Piston Rods, Bushings and Seals
NO COSTLY "DOWNTIME"
NO REPAIRS
NO MAINTENANCE
NO POWER WASTAGE

Miller

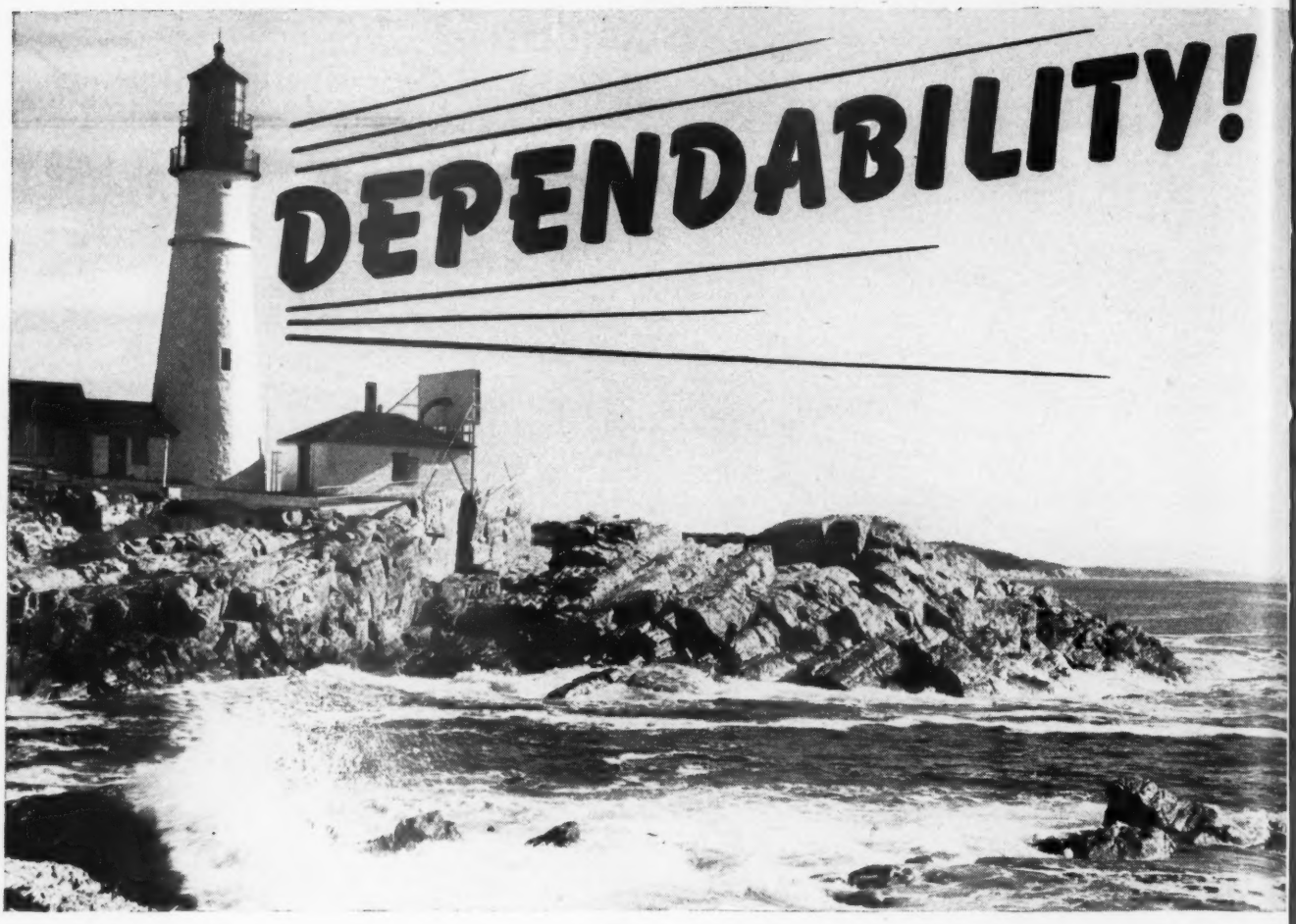
MILLER MOTOR COMPANY

2034 N. HAWTHORNE AVE. - - - - - MELROSE PARK, ILL.

AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOI

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON
HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS
MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE
ST. LOUIS and OTHER AREAS

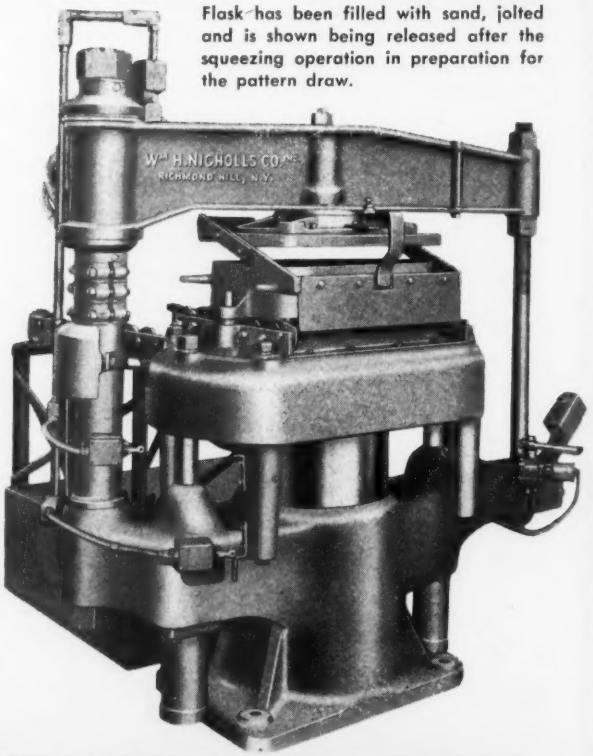
Sales and Service from coast to coast



HEAVY DUTY MOLDING Machines . . Jolt Squeeze and PATTERN DRAW . . . Equipment with Single Push Button . . . . for fully automatic Operation

HEAVY DUTY Combination Jolt and Power Squeezer Molding Machines with pneumatic pattern draw and power operated self positioning parallel squeeze head, equipped with electrical controls for single push button automatic operation of jolt, squeeze, pattern draw and cross arm, including automatic sand strike-off, mold pusher and adjustable flask roll-off device.

Flask has been filled with sand, jolted and is shown being released after the squeezing operation in preparation for the pattern draw.



Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL 18, LONG ISLAND, NEW YORK

ESTABLISHED 1910

Foreign Manufacturers and Selling Agents—For Continental Europe and Great Britain
George Fischer, Ltd., Schaffhausen, Switzerland

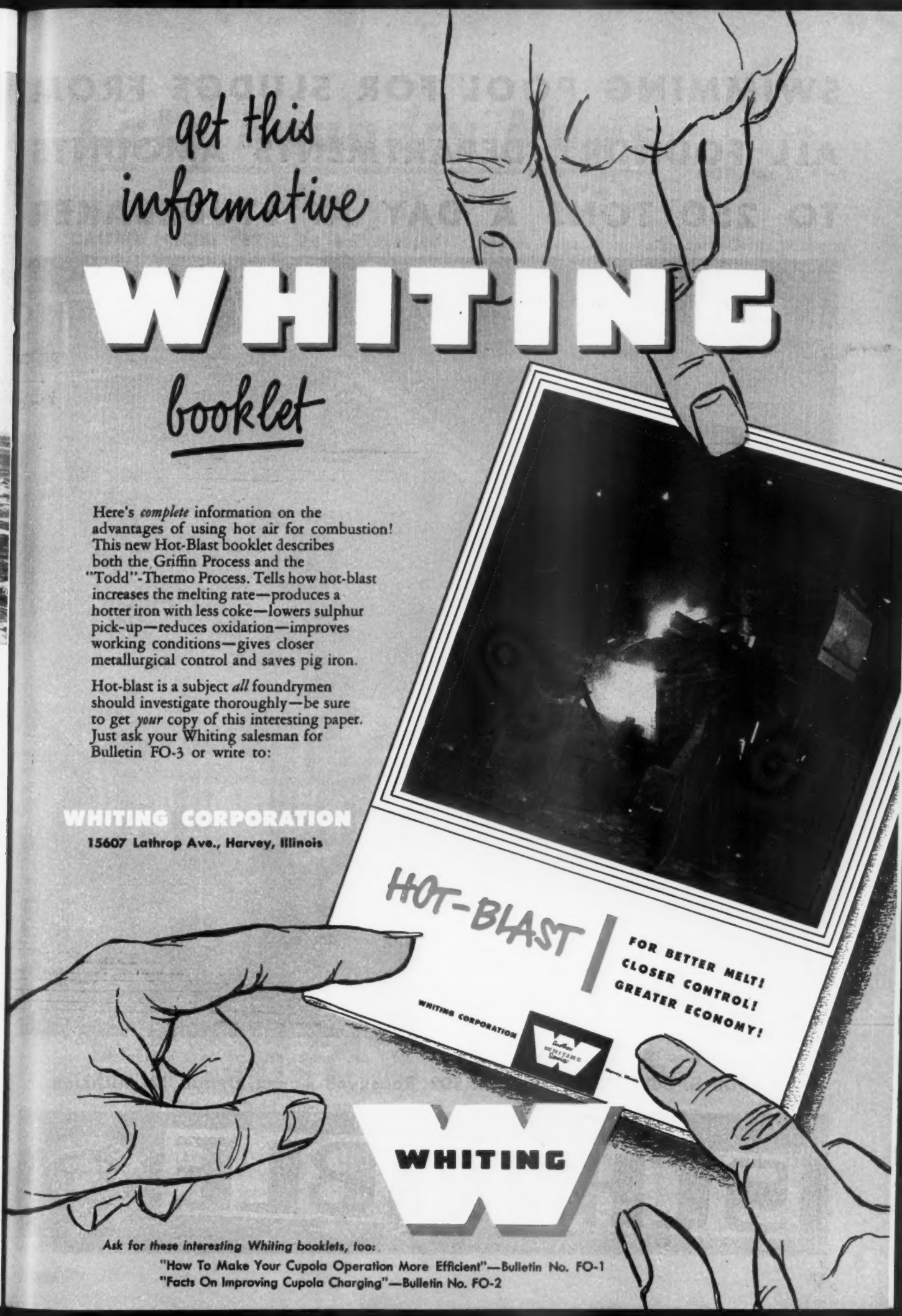
NICHOLLS

get this informative WHITING booklet

Here's *complete* information on the advantages of using hot air for combustion! This new Hot-Blast booklet describes both the Griffin Process and the "Todd"-Thermo Process. Tells how hot-blast increases the melting rate—produces a hotter iron with less coke—lowers sulphur pick-up—reduces oxidation—improves working conditions—gives closer metallurgical control and saves pig iron.

Hot-blast is a subject *all* foundrymen should investigate thoroughly—be sure to get *your* copy of this interesting paper. Just ask your Whiting salesman for Bulletin FO-3 or write to:

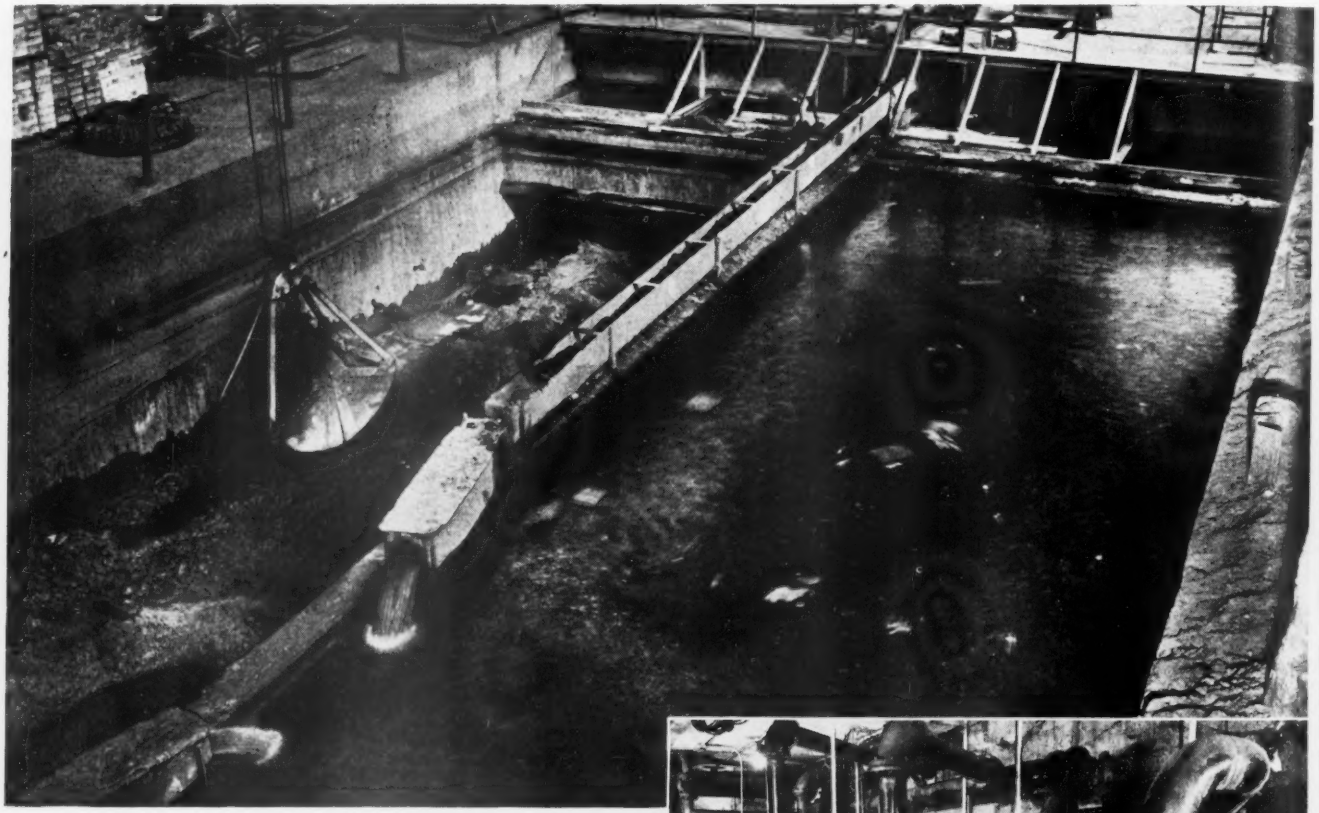
WHITING CORPORATION
15607 Lathrop Ave., Harvey, Illinois

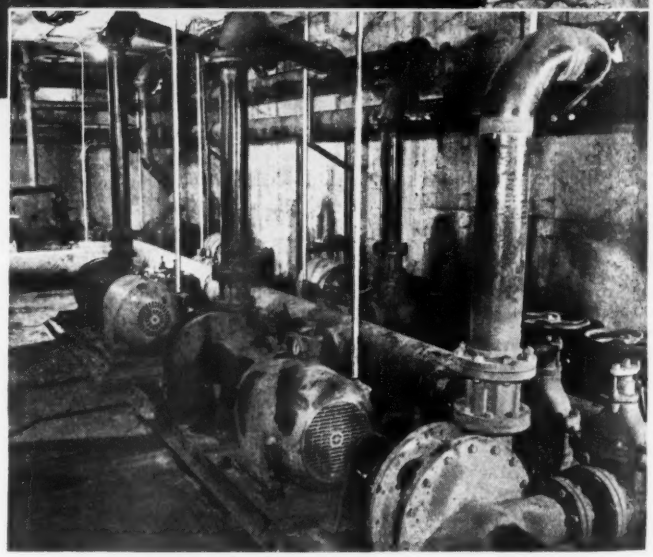


Ask for these interesting Whiting booklets, too:

"How To Make Your Cupola Operation More Efficient"—Bulletin No. FO-1
"Facts On Improving Cupola Charging"—Bulletin No. FO-2

SWIMMING POOL FOR SLUDGE FROM ALL FOUNDRY DEPARTMENTS AMOUNTS TO 250 TONS A DAY AT STUDEBAKER





This giant tank is the focal point for all material collected by 9 Multi-Wash units, 6 Schneible Cupola Collectors, core knockout and slag quench.

A sluice carries dust and refuse of all kinds by gravity water flow to this central settling and dewatering tank.

Water after settling is recirculated by the sludge pumps shown at the right, at the rate of 1800 gallons per minute to all collectors and returns via sluice to dewatering tank.

The economy, efficiency and the low maintenance cost of central sludge and water handling operation of the Schneible System has been proven over the years by foundries the country over. These large central systems are in operation in some 20 major foundries.

Write for Bulletin 510 for detailed information

CLAUDE B. SCHNEIBLE, P.O. Box 502, Roosevelt Annex, Detroit 32, Michigan

SCHNEIBLE

FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.

Late Foundry News

OCTOBER 25, 1951

CASTING PRICES: CPR-60, the regulation setting ceiling prices for castings, will be due for another postponement before it becomes effective. Originally scheduled to apply Sept. 1, it was put off first to Oct. 1, then to Oct. 26. Early in this week, however, the new regulation finally was signed incorporating various amendments to its earlier form, but carrying an effective date of Nov. 10.

SECURING RATINGS: Manfacturers of foundry equipment with the problem of securing necessary scarce materials, are insisting that foundries provide ratings on equipment purchased. Procedure for obtaining such ratings is not difficult. First, place the order for the equipment. Second, address a letter to A. J. McDonald, chief, Iron and Steel Castings Section, Iron and Steel Division, National Production Authority, with a carbon to Francis E. Fisher, chief, Foundry Equipment and Supplies Section, Metalworking Equipment Division, National Production Authority, Washington 25, giving this information: Copy of purchase order showing order number, name and address of supplier; description of machine; delivery required; delivery promised with rating; delivery promised without rating; backlog in dollars; percentage of all rated orders; list of defense order number with ratings; description of products manufactured by applicant, both normal and defense.

SCRAP PRICES: Changes in the price regulation on iron and steel scrap (CPR 5), effective Oct. 22, add a new foundry grade. Known as "hard steel cut 2 feet and under," it has a ceiling $5 above the base price for No. 1 heavy melting steel—but only when sold and shipped to a gray iron foundry requiring such material. Otherwise, the ceiling price for foundry steel 2 feet and under will apply. Another amendment, effective Oct. 30, makes No. 1 compressed bundles the base grade for steel scrap, instead of No. 1 heavy melting steel, which will be reduced $1 a ton from levels shown in the table on page 34. Net effect of this and other changes places No. 1 and No. 2 heavy melting and No. 2 bundles at $1 a ton below the price of No. 1 bundles. To discourage alleged over-emphasis on sale of foundry steel grades in 2 and 1 foot lengths, OPS has reduced the differentials over the base grade (No. 1 bundles after this month) by $2 a ton. This makes 2-foot lengths take the base price and 1-foot lengths $2 over base. The new hard steel grade, 2 feet and under, will continue $5 over base.

DEFENSE FACILITIES: Latest DPA list of approved certificates of necessity for accelerated tax amortization on new or expanded defense facilities includes these foundries: Boston Electro Steel Casting Inc., Boston; Crucible Steel Casting Co., Cleveland; Lakey Foundry & Machine Co., Muskegon, Mich.; Michiana Products Corp., Michigan City, Ind.; Sterling Steel Casting Co., Monsanto, Ill.; Calumet Steel Castings Corp., Hammond, Ind.

ALUMINUM CASTINGS: Advisory committee of the aluminum castings industry this week urged NPA to take immediate steps to stimulate the flow of aluminum scrap to secondary smelters. It also recommended that scrap be made a controlled material and that secondary ingot produced from such scrap be classified as an "A" product under CMP. Another recommendation was that all sales of scrap by generators, regardless of quantity, be certified to NPA, and that a spread be created between the generator's price of scrap aluminum and that of the dealer to allow the dealer a reasonable profit. NPA said a national scrap drive is being organized in nonferrous scrap. It also reported that the primary aluminum expansion program is about on schedule and that output is expected to increase substantially by the third quarter of 1952.

STEEL FOR FOUNDRY: Varying its consistent record of denying applications for more metal, the NPA Appeals Board has made an exception in the case of the Crane Co., Chicago. The board granted the company's petition for more controlled materials to enable it to continue an expansion of its steel foundry and to continue a modernization and expansion of its malleable foundry. Both projects, the board held, must be completed in the interest of the national defense.

UNDELIVERED ORDERS: A move to break the log-jam in orders for controlled materials—steel, copper and aluminum—requires a consumer to apply to his ensuing quarter's CMP allotment all controlled material orders not shipped by the seventh day of the quarter. This means that customers of aluminum ingot producers and steel, brass and bronze foundries who did not have their third quarter orders filled by Oct. 7 must apply subsequent receipts against their fourth quarter allotments.

SUBCONTRACTING: The Navy has issued the third edition of its "Subcontractor Opportunities with Navy Contractors." It lists parts in short supply required by Navy contractors to complete current contracts. These parts include castings. The booklet may be obtained from offices of the Inspector of Naval Material in major cities throughout the country, or from the Office of Naval Material, Department of the Navy, Washington.

COPPER-BASE SCRAP: Brass and bronze ingot makers are disturbed over the continuing shortage of copper and copper-base alloy scrap; their advisory committee recently made several recommendations to NPA to help relieve the situation. NPA replied that it planned to: Amend Order M-16

to change inventory restrictions on copper raw materials from 60 days to 30; have government-owned scrap used by industry to satisfy defense program needs; check brass mills, ingot producers and scrap dealers for compliance with prevailing regulations; inaugurate a nonferrous scrap recovery campaign; confer with OPS on correcting price factors believed to be retarding the flow of copper scrap.

WEATHER HURTS: Dry weather in the Pacific Northwest and the South has cut aluminum production by curtailing hydroelectric power supply, but the drop has been less than anticipated. NPA places the total September loss in production by this cause at 4.9 million pounds. Aluminum Co. of America says subsequent rains have improved the situation; losses for the year for this company now are placed at 2.2 million pounds instead of the 8 million originally expected. Ferrosilicon production has been hurt for the same reason but not enough to affect seriously the operations of consumers.

CRANE SCHEDULES: Overhead traveling crane industry, through its advisory committee to NPA, has approved a suggested six-month freeze of production schedules. This would provide time to set up a plan to determine degrees of essentiality in supplying equipment to users. It would apply to overhead cranes of 3 tons or more capacity. Some crane manufacturers report difficulty obtaining steel castings, but NPA says a check showed that 50 per cent of the companies were not offering CMP tickets to foundries, and therefore their orders were not being scheduled.

DEOXIDIZING: NPA Order M-84 specifies that not more than an average of 2½ pounds of aluminum for deoxidation may be used by a steel foundry per ton of steel castings produced during a month. This ratio is based on a ton of metal charged, not on a ton of finished castings.

MISCELLANY: Edward W. Greb, since June acting director of the NPA Salvage Division, has been appointed director. He was deputy chief of the WPB Industrial Salvage Branch during World War II . . . Swan Bergstrom, on leave as vice president, Cincinnati Milling Machine Co., Cincinnati, has been named director of the NPA Metalworking Equipment Division, replacing Harold Tigges, executive vice president, Baker Bros., Toledo, O. . . . Sheffield Steel Corp. has ordered a battery of 15 coke ovens from Koppers Co. for installation at Houston, Tex. . . . Foundry Services & Equipment Corp., Air Purification Corp. and Grindle Fuel Equipment Co. are being consolidated under the name Grindle Corp., 16231 Turner Ave., Markham, Ill.

PRICES OF FOUNDRY METALS AND COKE

(As of Oct. 25, 1951)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$17.00-18.00
New River	21.30
Wise County	15.95
OVEN	
Birmingham	$20.30
Chicago	23.00
Detroit	24.00
Erie, Pa.	23.50
Everett, Mass.	24.80
Indianapolis	22.75
Kearney, N. J.	22.75
Milwaukee	23.75
Painesville, O.	24.00
Philadelphia	22.70
Neville Island (Pittsburgh)	23.00
Portsmouth, O.	22.50
St. Louis (delivered)	25.40
Swedeland, Pa.	22.60
Terre Haute, Ind.	22.50

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$54.50	$55.00
Birmingham	48.88	....
Buffalo	52.50	53.00
Chicago	52.50	52.50
Cleveland	52.50	52.50
Everett, Mass.	55.25	55.75
Fontana, Calif.	58.50	....
Geneva, Utah	52.50	....
Granite City, Ill.	54.40	54.90
Lone Star, Tex.	48.50	48.50
Neville Island (Pittsburgh)	52.50	52.50
Steelton, Pa.	54.50	55.00
Swedeland, Pa.	56.50	57.00
Toledo, O.	52.50	52.50
Troy, N. Y.	54.50	55.00
Youngstown, O.	52.50	52.50

NONFERROUS INGOT

BRASS AND BRONZE: 85-5-5-5—27.25c; 88-10-2—38.50c; 80-10-10—32.25c; No. 1 yellow—23.25c.

ALUMINUM: 99 per cent plus, primary ingots 19.00c. Secondary No. 12 alloy 19.50c.

MAGNESIUM: 99.8 per cent standard ingots 24.50c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 24.50c, Connecticut valley; Lake 24.62½c, delivered.

ZINC: High grade 20.85c, delivered.

IRON AND STEEL SCRAP

(Ceiling prices per gross ton as established by the Office of Price Stabilization)

	*No. 1 Heavy Melting Steel	**Steel, 2 ft & less	Punchings, Plate Scrap	Cast Iron Briquets
Birmingham	$39.00	$41.00	$41.50	$39.00
Buffalo	43.00	45.00	45.50	43.00
Chicago	42.50	44.50	45.00	42.50
Cincinnati	43.00	45.00	45.50	43.00
Cleveland	43.00	45.00	45.50	43.00
Detroit	41.15	43.15	43.65	41.15
Eastern Pa.	42.50	44.50	45.00	42.50
Los Angeles	35.00	37.00	37.50	35.00
Pittsburgh	44.00	46.00	46.50	44.00
San Francisco	35.00	37.00	37.50	35.00
St. Louis	41.00	43.00	43.50	41.00
Seattle	35.00	37.00	37.50	35.00

Above delivered prices are ceiling levels at basing points indicated. * Applies to dealer and industrial scrap; railroad heavy melting is $2 higher. ** $3 higher when sold to gray iron foundries. $2 higher if 1 foot or under.

CAST IRON SCRAP

No. 1 cupola cast	$49.00
Heavy breakable cast	45.00
Burnt cast iron	41.00
Cast iron brake shoes	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Iron wheels, No. 1	47.00
Malleable	55.00
Drop broken machinery cast	52.00

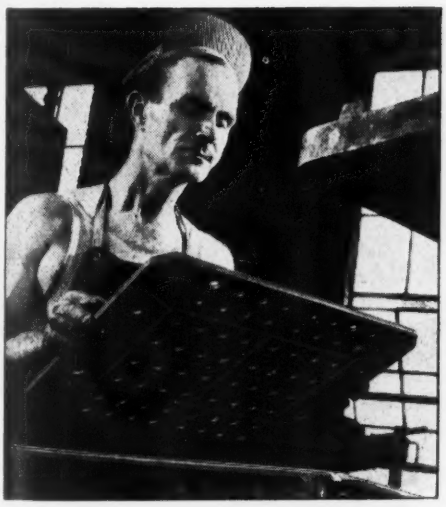
Above ceiling prices, per gross ton, are f.o.b. shipping point. Add transportation charges to obtain delivered prices at any foundry.

"EDCO Dowmetal BOTTOM BOARDS eliminate swelled castings"

. . . says E. F. Dublinski

Foundry Superintendent

Mid-City Foundry Co., Milwaukee, Wis.



Above photo shows Mid-City Foundry Company molder placing EDCO DOWMETAL Bottom Board on flask preparatory to pressing. Mid-City Foundry produces high quality gray iron and alloy castings.

Take a tip from E. F. Dublinski. He speaks from experience in saying —"EDCO DOWMETAL Bottom Boards eliminate swelled castings". Since switching to magnesium boards, Mid-City Foundry does not have castings ruined through swelling caused by depressions burned into out-dated wood boards.

EDCO DOWMETAL Bottom Boards help produce castings that are true to pattern. The exclusive grooved and vented design permits escape of gasses, and insures mold stability. Causes for rejects are kept to a minimum.

"We consider EDCO DOWMETAL Bottom Boards as permanent equipment at Mid-City," adds E. F. Dublinski, "because they'll outlast wooden boards at least 30 to 1 and in no time at all pay for themselves."

Your molders will like handling these boards because they are light in weight, easy to stack, and there's no danger of splinters. EDCO DOWMETAL Bottom Boards will not warp or rot—there are no nails to come out, nothing to break or split—no upkeep.

Write us, or phone CApitol 7-2060 for price schedule and list of 74 standard sizes available from stock.

CHRISTIANSEN CORPORATION

1517 N. KILPATRICK AVENUE • CHICAGO 51, ILLINOIS

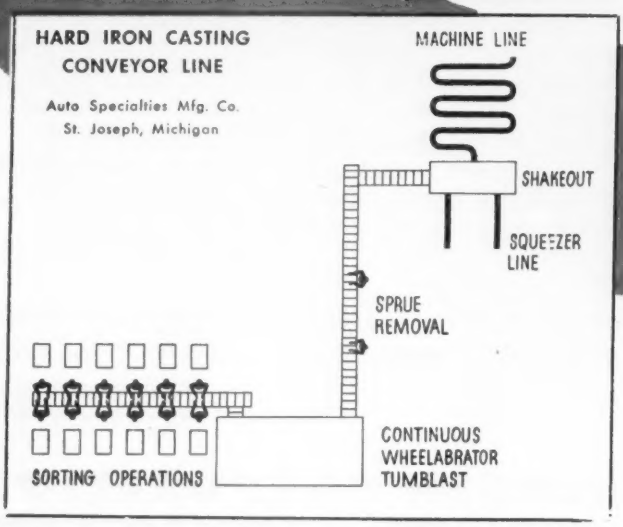
Aluminum Alloy Ingots • Zinc Base Casting Alloys

In a CONTINUOUS WHEELABRATOR® TUMBLAST*

at AUTO SPECIALTIES MFG. CO., St. Joseph, Michigan

12 tons of hard iron wheelabrated

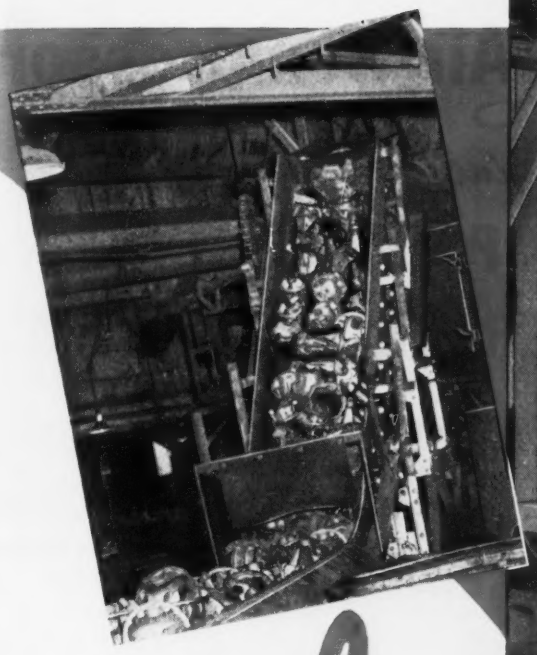
continuously · uniformly · automatically

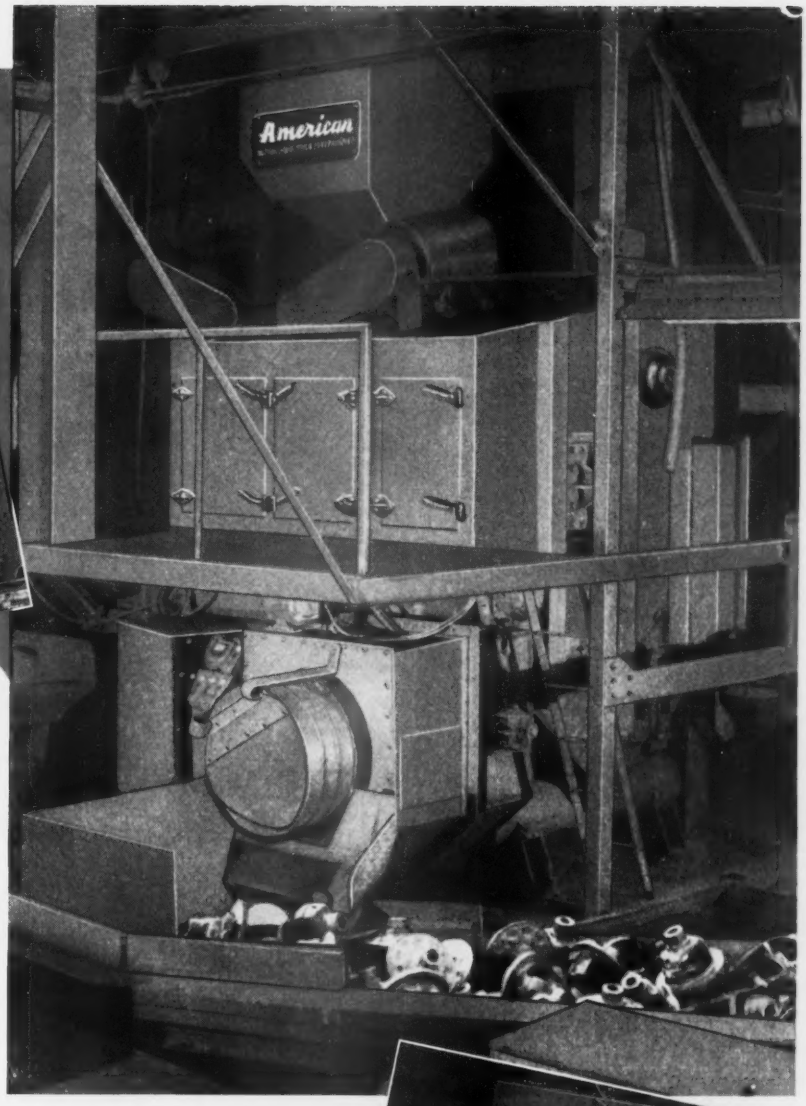


*Auto Specialties Mfg. Co. now has 3 Continuous Tumblasts in operation.

Send today for descriptive tinuous Tum Bulletin No.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMEN





nourly

Another Wheelabrator first—the high-production blast cleaning of hard iron castings offers tremendous time-and-money-saving possibilities for malleable foundries. These savings are convincingly proved in the performance record of a 48" Continuous Wheelabrator Tumblast at the Auto Specialties Manufacturing Company. Every hour, twelve tons of varied size and type castings are cleaned uniformly and automatically.

Still hot, the hard iron castings enter the Continuous Tumblast within an hour after being poured. All molding sand is removed without breakage of the fragile pieces. The gentle, yet effective tumbling action of the exclusive endless conveyor mechanism exposes all surfaces to the scouring action of the abrasive blast.

RESULTS ACHIEVED AT AUTO SPECIALTIES

1. **Continuous, uniform cleaning.**
2. **High rate of production.**
3. **Elimination of handling. (Transporting—Storage)**
4. **Permits inspection prior to annealing.**
5. **More orderly sorting.**
6. **Saving in valuable floor space.**
7. **Increased foundry efficiency through a more orderly flow of work.**
8. **Hundreds of different sizes and types of castings are effectively cleaned in one machine.**

In addition, cleaning in the hard stage makes annealing faster, more thorough and simplifies removal of annealing scale.

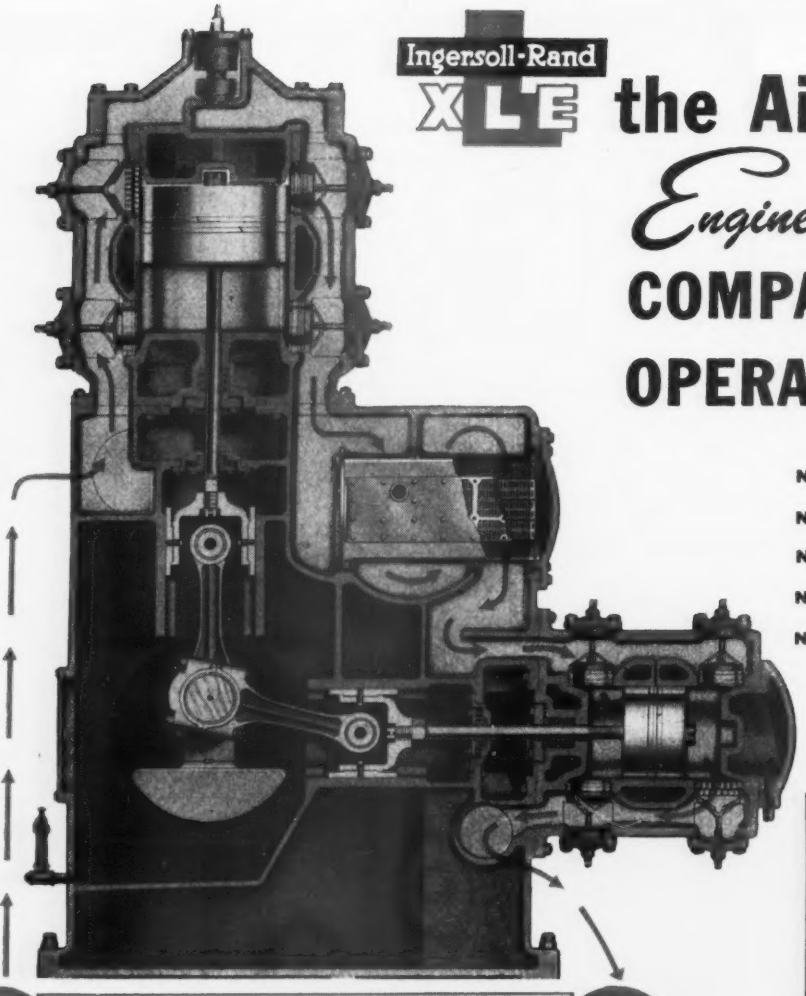
American WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka 2, Indiana

Ingersoll-Rand

XLE

the Air Compressor

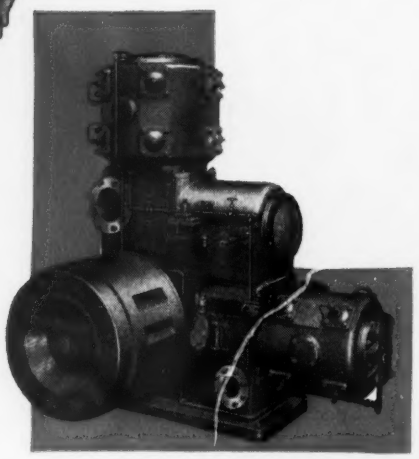
Engineered for COMPACTNESS AND OPERATING ECONOMY



NEW *Air Flow* DESIGN
NEW *Intercooler* DESIGN
NEW *Cylinder* DESIGN
NEW *Frame and Running Gear* DESIGN
NEW L DESIGN

PIPELESS THRU-FRAME AIR FLOW

Main air connections on the compressor frame eliminate piping strain from the cylinders. Air flow between these two points is entirely within the frame and cylinders. There is no interstage piping. The streamlined frame houses the intercooler and combined with the wide-flanged cylinders provides a sturdy construction that maintains alignment.



Packaged design for minimum floor space, and specially balanced for minimum foundation . . . ideal for skid-mounting.

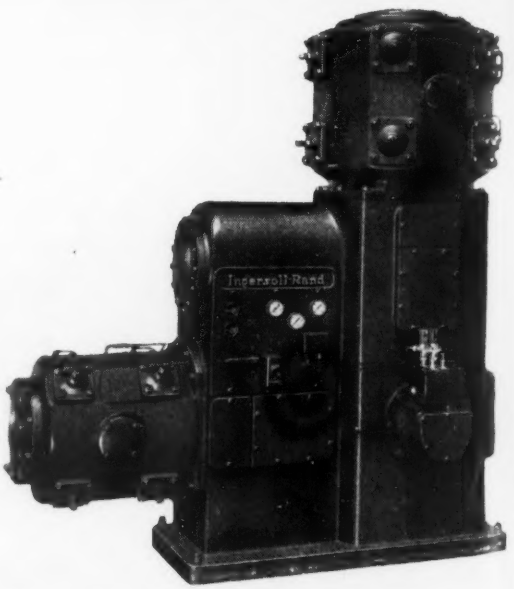
Easy to operate . . . push button starting, grouped controls, automatic force-feed lubrication, automatic condensate removal, automatic air-operated starting unloaders and capacity control.

Easy to install or relocate . . . ready-to-run, assembled shipment . . . simplified air and water piping.

Easy to maintain . . . simplified long-life construction . . . full-floating, cool-running, aluminum-alloy bearings that require no adjustment . . . no need to open the sealed crankcase which stays clean inside . . . streamlined exterior also easy to keep clean.

Low operating costs . . . new high-efficiency, long-life I-R Channel Valves result in compressor efficiency comparable to the largest units . . . durable, high-efficiency tube-and-fin intercooler saves water . . . efficient direct-connected motor.

Built for reliable, continuous full-load service . . . sizes 125, 150, 200, 250, 300, 350 horsepower . . . discharge pressures 80 to 125-psi, two stage . . . write for more information today.



Ingersoll-Rand

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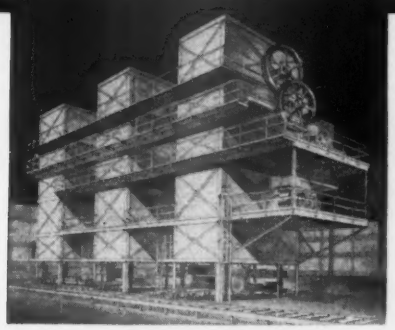
ROCK DRILLS • AIR & ELECTRIC TOOLS • OIL & GAS ENGINES • PUMPS • TURBO BLOWERS

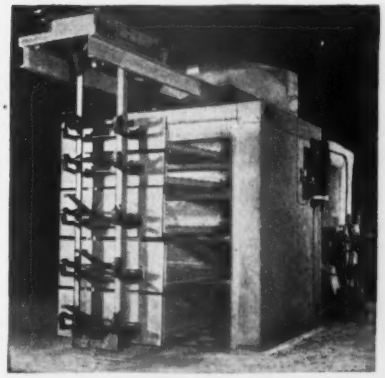
Many

OF THE OUTSTANDING CORE AND MOLD OVEN INSTALLATIONS SHOW PREFERENCE FOR ENGINEERING *by*

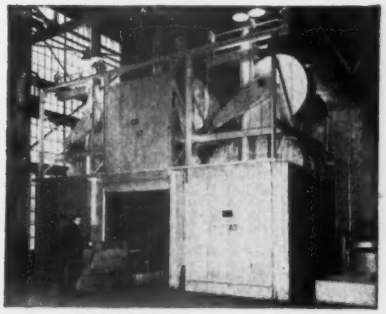
CARL-MAYER



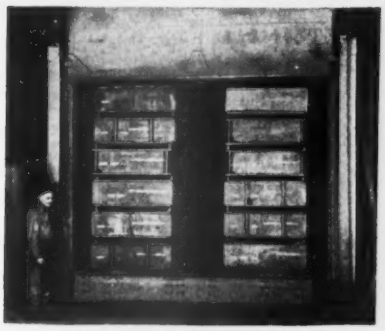
VERTICAL CORE OVENS
at General Steel Castings Co.



ROLLING DRAWER CORE OVEN
at Aluminum Co. of America



RACK TYPE CORE OVENS
at Aluminum Co. of America



CAR TYPE MOLD OVEN
at Oil Well Supply Co.

OUR CUSTOMERS

Important concerns like these:

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Blaw-Knox Co.
Brown Industries
Buick Motor Div. of General Motors Corp.
Bucyrus-Erie Co.
Cadillac Motor Div. of General Motors Corp.
Columbia Steel Corp. (U.S. Steel Corp.)
Crucible Steel Castings Co.
Dunkirk Radiator Co.
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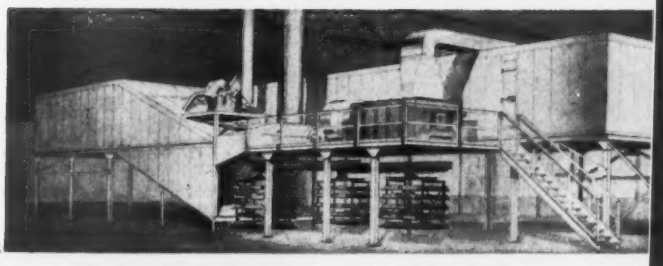
In Carl-Mayer design, there is a vivid picture of unusual achievements in operating speed, efficiency and fuel economy.

Write for Bulletins No. 141 and 350

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES



HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co

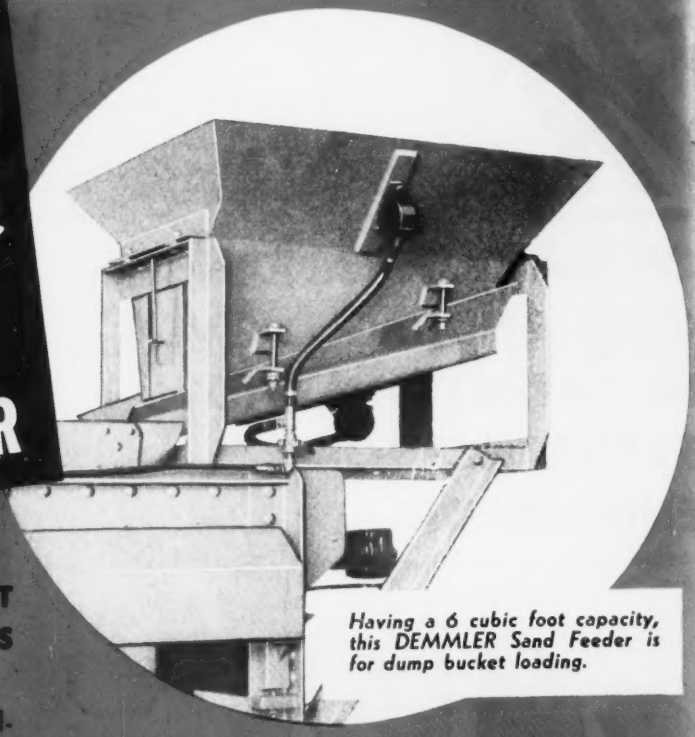
THE CARL-MAYER CORPORATION

3030 Euclid Avenue • Cleveland, Ohio

BACKED BY REPUTATION AND OVER 30 YEARS' EXPERIENCE

ANNOUNCING
THE NEW

DEMMLER VIBRATORY SAND FEEDER



Having a 6 cubic foot capacity, this DEMMLER Sand Feeder is for dump bucket loading.

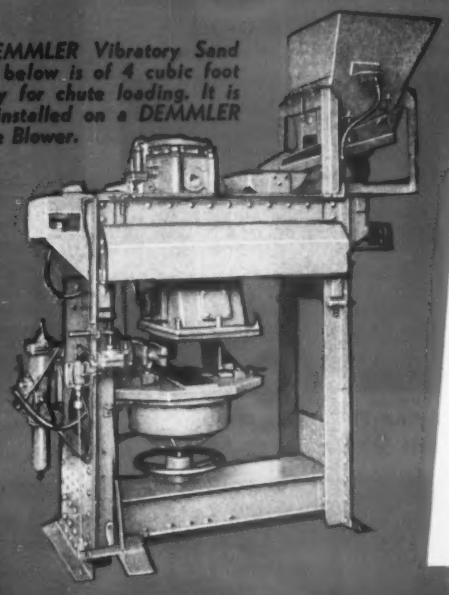
FOR CHUTE OR DUMP BUCKET LOADING OF CORE BLOWERS

Here's another dependable DEMMLER development that means increased core production at lower cost!

It's the new DEMMLER Non-clogging Vibratory Sand Feeder that makes it unnecessary for machine operators to take "time out" to load sand.

Under development and exhaustive tests for 2 years, the DEMMLER Vibratory Sand Feeder is powered by two comparatively noiseless rotary type vibrators in which an air stream forces a 1-3/8" steel ball around a hardened steel track.

The DEMMLER Vibratory Sand Feeder below is of 4 cubic foot capacity for chute loading. It is shown installed on a DEMMLER 3K Core Blower.



SAND FLOWS "LIKE WATER"

Sand is stored in the hopper above a sloping chute. When the core machine carriage is in filling position, the feeder starts automatically, walking the sand down the chute into the sand magazine. Because of its vibrating action, sand is delivered into the core blower in an ideal condition for blowing. No poking by operator is ever required because sand flows like running water — even when it is so stiff you can pack it into "snow-balls"! Sand flow stops automatically when core machine carriage is in blowing position.

Sand feeder cannot overfeed. When hopper is full, sand delivery stops.

EASY TO MAINTAIN — WILL LAST INDEFINITELY

The DEMMLER Vibratory Sand Feeder requires absolutely no attention once set into operation with cycle of machine. Maintenance of sand feeder is negligible since there are extremely few moving parts. This means long, long life!

Available for any DEMMLER Core Blower, from the small No. 55 to the large No. 4E, the non-clogging sand feeder is shipped complete with all valves and equipment necessary for mounting. It is available in 4 cu. ft. capacity for chute loading and in 6 cu. ft. capacity for dump bucket loading.

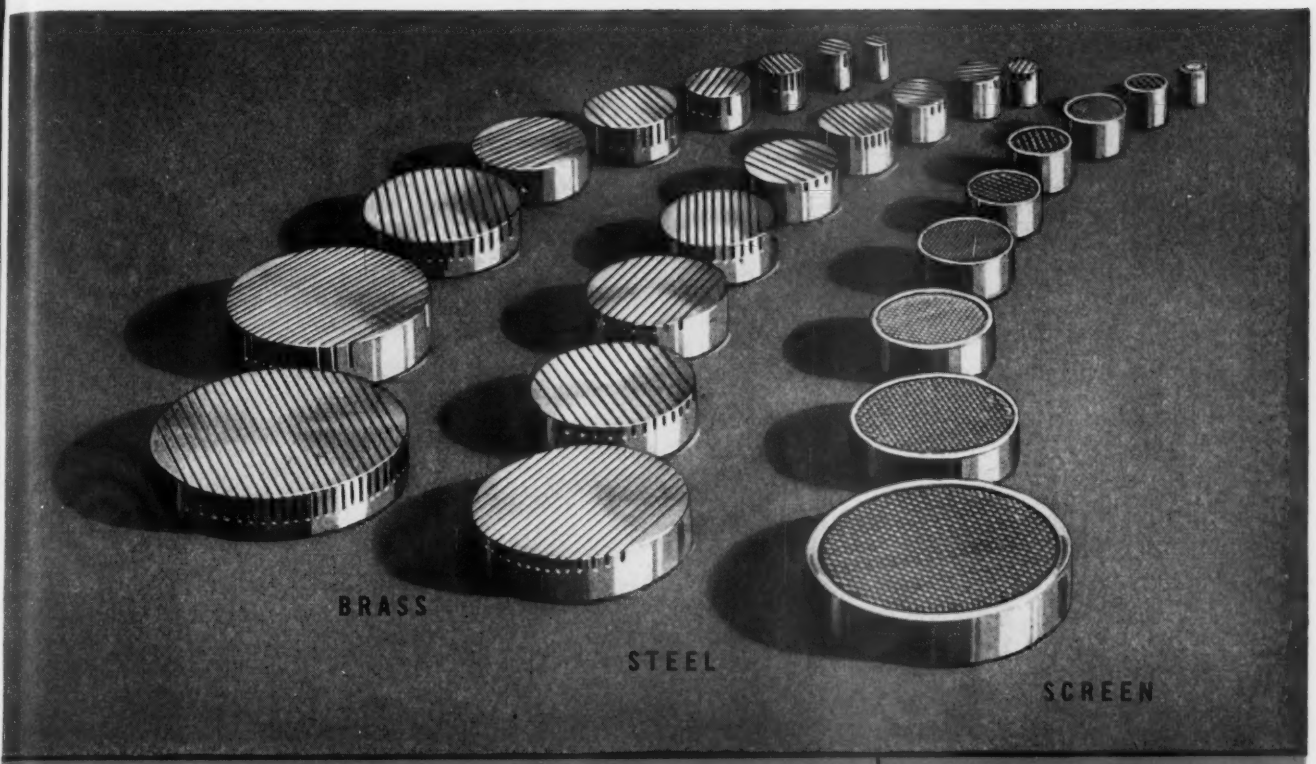
Should a larger sand storage capacity be required, the customer can easily extend the sides of the storage hopper furnished on the feeder.

Write — today — for complete details!

Wm. DEMMLER & BROS.

KEWANEE, ILLINOIS

Speed plus dependability ★ *Manufacturers of Core Blowers Exclusively Since 1911*



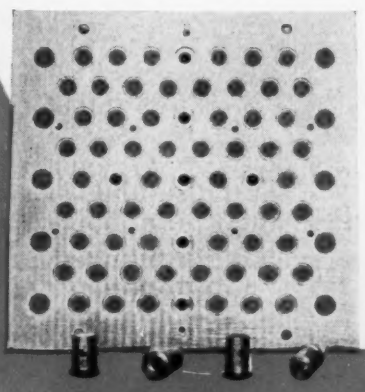
PRECISION CORE BOX VENTS BY

DEMMLER

• You eliminate all guesswork when you use precision made DEMMLER Core Box Vents. These high-quality vents adhere precisely to specifications because they are precision built to close tolerances. In addition, DEMMLER core box vents possess great rigidity — are truly designed for practical foundry application.

Dependable, efficient, long-lived DEMMLER core box vents are available in brass slotted, steel slotted and screen types. Each of these types offer a wide variety of sizes to meet every application.

Always specify DEMMLER core box vents — you can count on them for quality far above ordinary standards.



UNIVERSAL BLOW PLATE

DEMMLER Universal Blow Plate consists of two plates with separators between, allowing the air from the core box to escape between the plates. The blow tubes and vent bushings are interchangeable so any hole in these plates can be used either as a blow hole or a vent. These plates are recommended for use only on open top, or half core boxes. They are manufactured in any size to suit the bottom dimension of the sand magazine.

Write for Illustrated Folder

WM. DEMMLER & BROS., KEWANEE, ILLINOIS

Manufacturers of Core Blowers Exclusively Since 1911

SPECIFICATIONS

BRASS SLOTTED CORE BOX VENTS

Slot Widths: .010", .013", .015"

Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1-1/4", 1-1/2"

The brass slotted vents have thick heads, so that they may be used in round or curved core box surfaces, and the heads scraped to conform to the contour of the box. Very fine sand requires the use of vents with .010" slots, but .015" slots may be used, with the usual lake sand core mixtures.

STEEL SLOTTED CORE BOX VENTS

Slot Widths: .010", .013", .015"

Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1-1/4", 1-1/2"

The steel slotted vents have thin heads, to make them easy to keep clean, and are preferable for use in flat surfaces of core boxes. They are hard chrome plated to prevent rust.

SCREEN TYPE CORE BOX VENTS

Mesh: #30, #40, #50

Diameters: 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1-1/4", 1-1/2"

Screen type vents provide maximum ventilation, and are preferred by many of our customers for this reason. Coarse screen vents may be used in core prints, where it does not matter if the vent leaves a slight mark on the core. They are also useful in vented plates used under core boxes which are open at the bottom.

How Does U. S. Rubber make it easier to grind manganese?

U. S. ROYALITE WHEELS are used by this customer to smooth and clean up casting of crusher jaw.

By developing wheels especially designed to be used on manganese, U.S. Rubber technicians make it easier to handle this extremely tough steel.

Bring your questions on grinding wheels to "U.S." engineers. They will make sure you receive properly engineered wheels in which you can have complete confidence.

U. S. ROYALITE WHEELS grinding pug mill knives.

U. S. ROYALITE® WHEELS are used to grind throat liners.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Here's "on the job" proof of furnace savings with

B&W ALLMUL FIREBRICK

BILLET HEATING FURNACE

"ALLMUL cost half as much!"

A builder of billet heating furnaces used an expensive electrically-fused mullite refractory in the piers and baffles as well as for the arches in the discharge end of the flue. Reason? Severe operating conditions at these points. Tests of B&W Allmul proved it withstood high temperatures equally well . . . cost approximately half as much. Result? Allmul is now standard for these locations.

BUTT WELDING FURNACE

"39 weeks instead of 6 weeks!"

Semi-mullite brick bungs in the hottest part of a butt welding furnace spalled badly after six weeks. Allmul bungs in the same location were still going strong after *39 weeks*—in better condition than the semi-mullite bungs after six weeks. *Yet Allmul cost little more than the original semi-mullite refractory.* Allmul is now used in uptake arches, uptake side walls and crossovers. Customer has ordered 30 carloads to date.

CUPOLA FRONT-SLAGGER

"ALLMUL has 6 times the life plus . . ."

Replacing super-duty firebrick in a cupola front-slagger of a malleable duplexing operation three times a week was an expensive chore. B&W Allmul in the same location lasts approximately two weeks . . . *six times as long.* Costs drop, too, because of savings due to less frequent relining.

What's behind the remarkable, money-saving performance of B&W Allmul Firebrick? The answer lies in its low first cost for a fused mullite brick and unique combination of excellent refractory properties: high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F. Bulletin R-29 gives all the facts on Allmul. Write for your copy.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

R-429

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

Rotor's 15 New "Multi-power" Chippers are easier to handle . . . do jobs faster

The unique hollow piston and "doughnut" valve of the 15 new Rotor "Multi-power" Chipping Hammers provide the 1-2 punch to cut your chipping costs.

Lighter Weight. These new Rotor Chippers average 1½ to 2 lbs. lighter than other chippers making them easier to handle.

Shorter. Exclusive "doughnut" valve makes possible saving of 1″ to 2″ in length, making it easier to get into those tough, crowded corners.

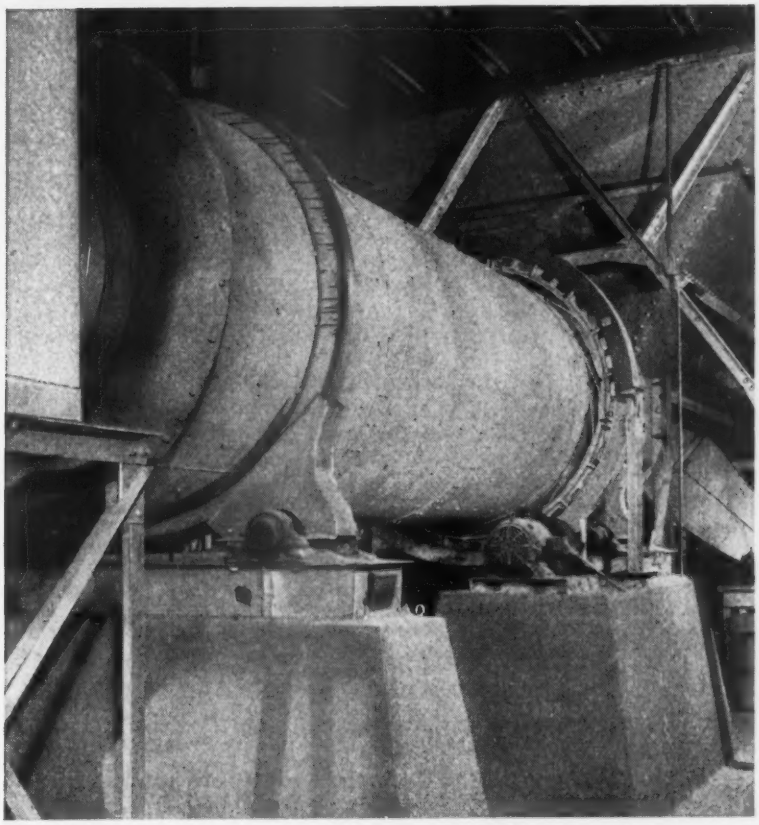
Faster Cutting. You get more blows per minute . . . because of new exclusive design.

3 Models in 1. By a simple change of parts you can adapt each of the 5 basic models to serve as 3 hammers to match your job: (1) A "regular" model, (2) A "super-speed" model, (3) A "super-sock" model.

This is the biggest advancement in chipping hammers in the past 15 years! Find out all about it! Write for catalogue No. 37.

AIR O'TOOL

Get more dry, cool sand... in less floor space



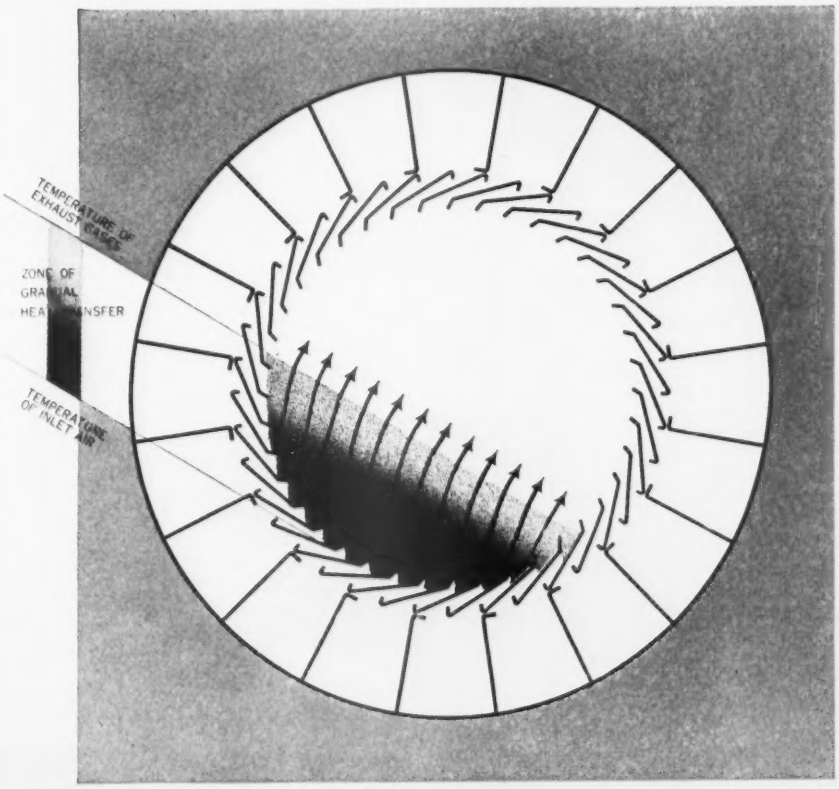
Drying 10 tons of core sand per hour, this Link-Belt Roto-Louvre Dryer is used with a gas-fired furnace and dust-collecting system.

LINK-BELT Roto-Louvre Dryer delivers large volume of dry sand ... at cool discharge temperatures

MODERN, mechanized foundries require cool, dry sand for cores and molds . . . and lots of it! High capacities call for high temperatures. And with ordinary dryers that means an extra cooler — or sand so hot it won't mix properly with core oil and is difficult to handle.

But not with Link-Belt's Roto-Louvre Dryer! Here's a unique design that utilizes controlled high temperatures for high capacities . . . delivers sand at 120 to 130° F with a moisture content of only 0.5%. What's more, it takes only half the floor space required by other drying equipment.

Book 1911-A has the complete story on Roto-Louvre Dryers. Or you can get all the facts from your Link-Belt foundry specialist.



Gradual Heat Transfer Assures Uniformly Dry Sand

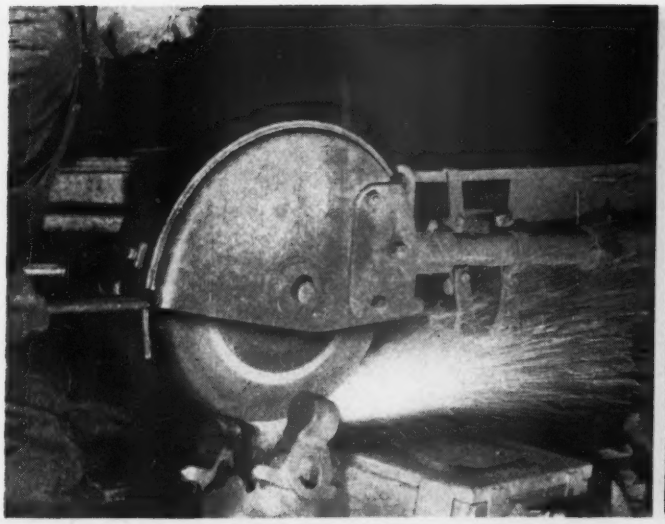
Gentle rolling action over slowly revolving louvres results in uniform treatment, thereby eliminating spotty over- or under-drying. Gradual drying of the sand, as it progresses through the Roto-Louvre Dryer, affords a uniform moisture content of the product at a low final temperature.

LINK-BELT

HANDLING and SAND PREPARATION MACHINERY

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,550

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

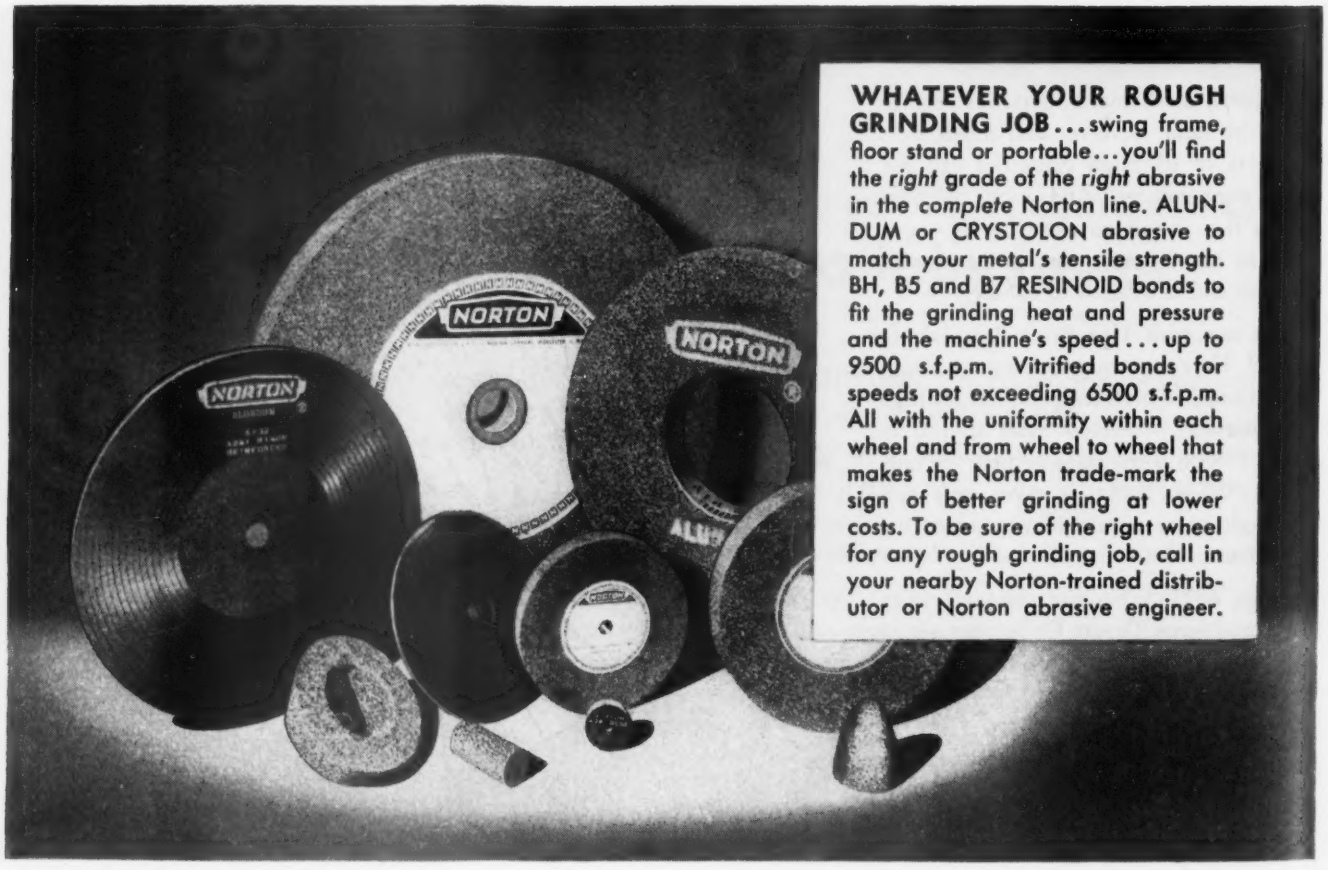


WHEN THE PRESSURE'S HEAVY . . . Norton ALUNDUM* or CRYSTOLON* wheels with BH or B7 RESINOID bond take high-speed heat in stride . . . giving you fast, clean cuts without sacrifice of wheel life. Select Norton ALUNDUM abrasive for steel and annealed malleable iron; CRYSTOLON abrasive for gray iron, unannealed malleable iron and non-ferrous metals.

WHEN THE PRESSURE'S LIGHT . . . Norton ALUNDUM or CRYSTOLON wheels with B5 RESINOID bond get the call. They combine cutting qualities with wheel economy in a way that makes your high-speed grinding look good and your costs look better. Again, Norton ALUNDUM abrasive when the metal's tensile strength is high; CRYSTOLON abrasive when it's low.

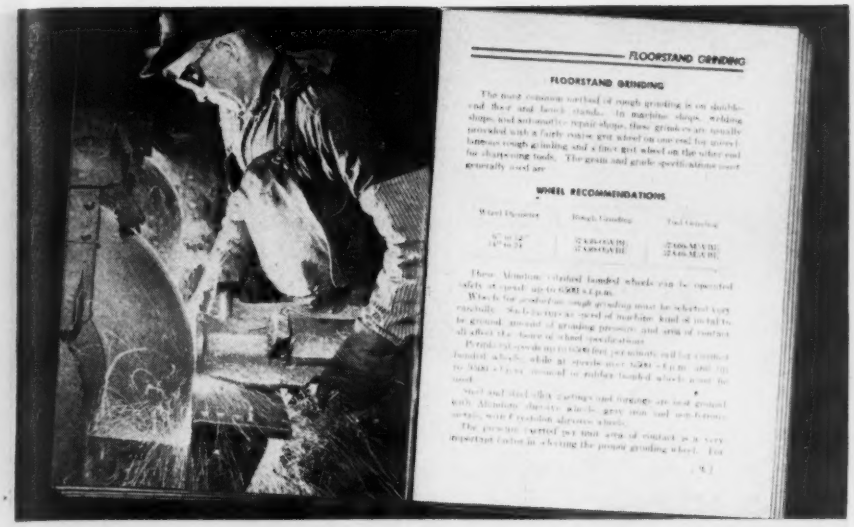
Snag off more metal per dollar

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries



WHATEVER YOUR ROUGH GRINDING JOB . . . swing frame, floor stand or portable . . . you'll find the *right* grade of the *right* abrasive in the *complete* Norton line. ALUNDUM or CRYSTOLON abrasive to match your metal's tensile strength. BH, B5 and B7 RESINOID bonds to fit the grinding heat and pressure and the machine's speed . . . up to 9500 s.f.p.m. Vitrified bonds for speeds not exceeding 6500 s.f.p.m. All with the uniformity within each wheel and from wheel to wheel that makes the Norton trade-mark the sign of better grinding at lower costs. To be sure of the right wheel for any rough grinding job, call in your nearby Norton-trained distributor or Norton abrasive engineer.

NORTON *Making better products to*



YOU SNAG OFF MORE METAL PER DOLLAR when you base your wheel selection on *all the facts* about rough grinding. That's why it will pay you to read this 48-page booklet prepared by Norton abrasive engineers. In addition, its convenient selection charts, like the one shown above, give you valuable help between calls of your Norton representative. Write for FORM 1405.

. . . with the right Norton wheel

Production speed and grinding economy are more important to you than the size of your wheel inventory.

When you replace wheels that are almost right with exactly the *right* wheel specification for every rough grinding job, you increase production and reduce costs. That's plain common sense. To insure lowest cost production the wheels must fit such variables as: the materials to be ground . . . the amount of stock to be removed . . . the degree of accuracy and finish required . . . the area of contact . . . the amount of pressure applied and heat generated . . . the type of grinding machine.

All these factors are covered in great detail in the Norton booklet on Rough Grinding. Out of each page pop such valuable guides to proper wheel selection as:

ALUNDUM abrasive wheels for grinding tough alloy and carbon steels, soft malleable iron castings.

CRYSTOLON abrasive wheels for cast iron, hard malleable iron castings, brass, aluminum, and magnesium.

Softer Grades and Coarse Grain Sizes where grinding pressure is light or area of contact is large.

Harder Grades and Coarse Grain Sizes for heavier grinding pressures.

Fine Grain Sizes and hard grades for narrow contacts and good finishes.

Resinoid Bonds for high-speed grinding.

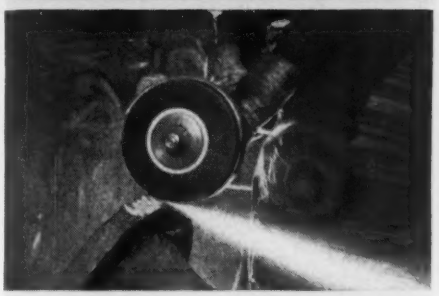
Vitrified Bonds for slower speeds.

These and many other production-boosting, cost-cutting factors are authoritatively covered in this 48-page Norton booklet. Ask your nearby Norton representative or distributor, or write direct for FORM 1405. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

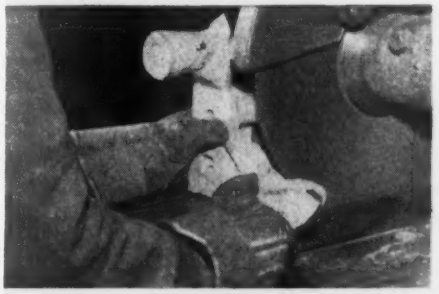
NORTON
ABRASIVES

make other products better

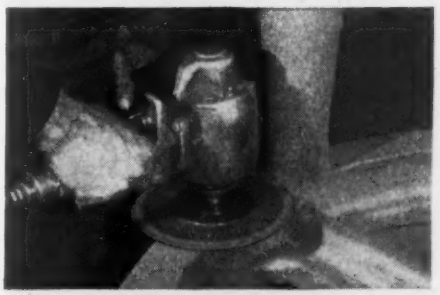
It Pays To Know All The Facts



HIGH SPEED ON THE CURVES is no problem at all when you select from the complete line of Norton portable grinding wheels. There's a cup, cone, plug, or mounted point for every radius . . . all with the famous Norton built-in balance that makes them hug the work. Try them and see!



25% FASTER THAN BAND SAWS for removing sprues, gates, and risers from nonferrous castings, report users of the NORFLEX* reinforced resinoid cut-off wheel. Its reinforced construction and knurled sides make it your *safest* bet for jobs where side-grinding, twisting, and bending cause conventional wheels to break. Worth testing!



3 JOBS WITH ONE WHEEL will be your experience, too, when you put a Norton Reinforced Hub Wheel to work. The same wheel not only does rough and finish grinding, but also notches risers in ferrous castings. Reinforced by strong fabric with an extra safety web molded into the hub side, it's the safest, most durable wheel of its kind in the field. Compare!

NORTON COMPANY
Worcester 6, Mass.
Distributors in all principal cities

PAYLOADERS Can Help You Too

FOUNDRIES and metal-working plants in increasing numbers are installing Hough PAYLOADERS because they are a sure, proven way to lick rising costs, solve manpower shortages and increase output.

A PAYLOADER more than pays its way every day — actually pays for itself within a few months doing the many jobs listed here and doing them faster and cheaper . . . releasing manpower for more productive work.

The 12 cubic foot Model HA shown is the smallest of the PAYLOADER line that includes graduated sizes up to 1½ cubic yard bucket capacity. Every PAYLOADER is a complete, Hough-built tractor-shovel specifically designed with multiple reverse speeds and other features that insure fast, low-cost bulk material handling. They are backed by 30 years of material-handling equipment manufacture and are sold and serviced by a world-wide Distributor organization. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.

Literature on any size PAYLOADER will gladly be sent without obligation.

On These Jobs

Unload box cars.
Carry sand, coke, scrap, limestone, etc., to storage.
Transport and distribute sand to molding stations.
Remove used sand from floors.
Windrow sand for the cutter.
Charge mullers, hoppers, tumbling barrels.
Feed conveyors, elevators, mixers, screenerators.
Clean up gangways, aisles and other areas.
Handle coal, ashes, cinders.
Handle scrap and small castings.
Maintain private roadways.
Do crane work—haul, push.
Remove snow.

SAY "HUFF"

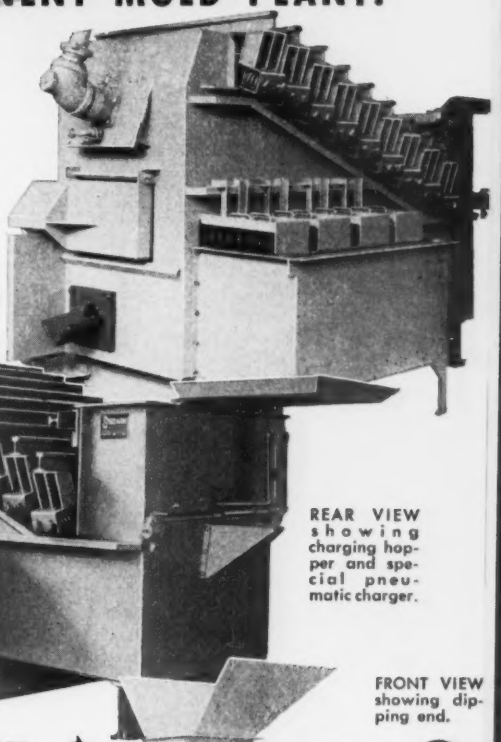
PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

STROMAN FURNACES

FOR *Every* ALUMINUM MELTING JOB IN *Any* FOUNDRY, DIE CASTING OR PERMANENT MOLD PLANT!

Stroman builds the most efficient, fastest melting and most economical furnaces available. One of these famous four will handle your every melting requirement at great savings.

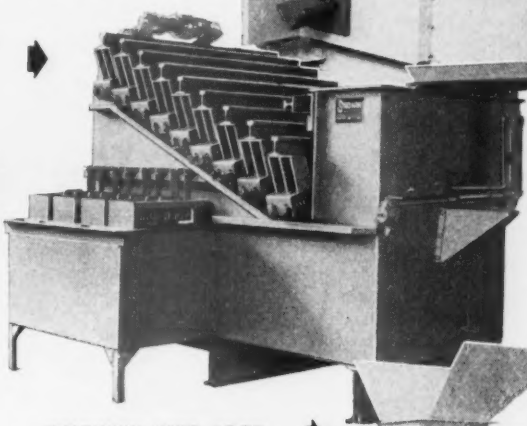


FRONT VIEW showing dip-out box, tapping spout, slagging and cleanout door.

STROMAN TYPE "MC" ALUMINUM DIP-OUT REVERBERATORY FURNACE

Bath capacity from 500 to 10,000 lbs. Aluminum

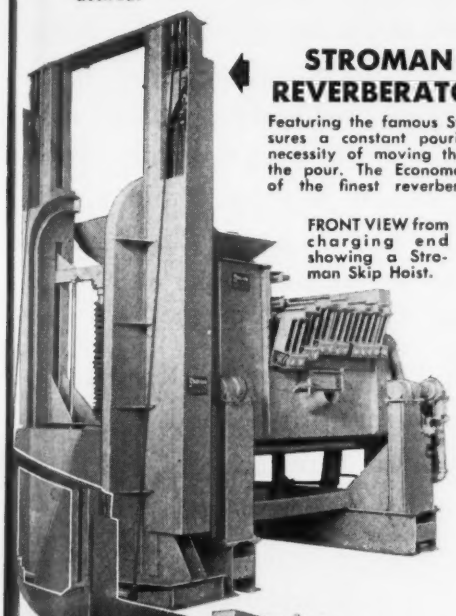
A combination of breakdown and holding furnaces makes this the most economical furnace ever designed for aluminum melting. It can be used for melting, holding, alloying, fluxing, for either casting or producing ingots. Cold metal does not reach the molten bath. Hot metal is always available for dipping. No iron pots or crucibles to buy. Oil, gas or combination oil-gas fire. Complete automatic controls are available if desired.



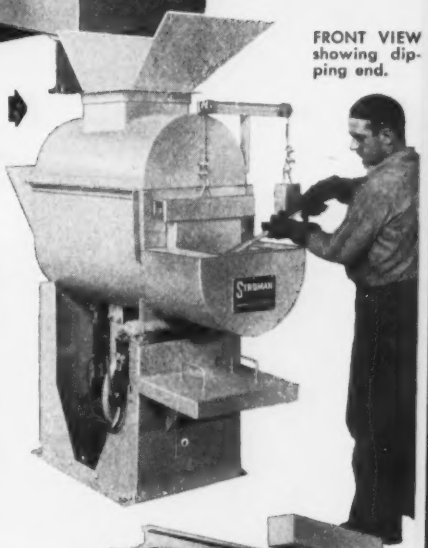
REAR VIEW showing charging hopper and special pneumatic charger.

STROMAN ECONOMELT REVERBERATORY FURNACES

Featuring the famous Stationary Lip Pour which assures a constant pouring arc and eliminates the necessity of moving the ladle at any time during the pour. The Economelt is without a doubt one of the finest reverberatory furnaces ever built. Melting speeds for Aluminum, Brass, Bronze, or Grey Iron are unsurpassed. All metal is preheated and melted in suspension in the throat of the hopper. This furnace is showing upwards of 40% savings in fuel costs. Oil, Gas or Combination Oil-Gas Fire. Charging Hoist and Furnace tilting are operated hydraulically. Hydraulic systems are furnished as complete units including operating valves, etc. Capacity in Aluminum up to 10,000 lbs. total bath. Write for Bulletin No. 635 for complete information.



FRONT VIEW from charging end showing a Stroman Skip Hoist.

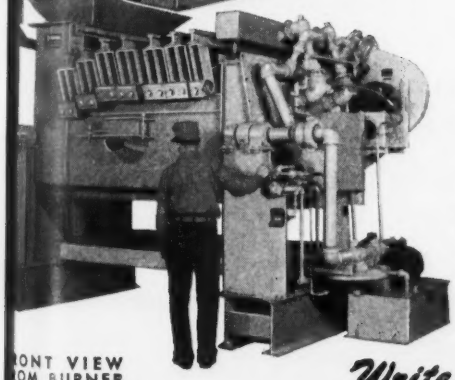


FRONT VIEW showing dipping end.

STROMAN TYPE "DS" REVERBERATORY FURNACE FOR MELTING ALUMINUM

300 and 500 lbs. bath capacities.

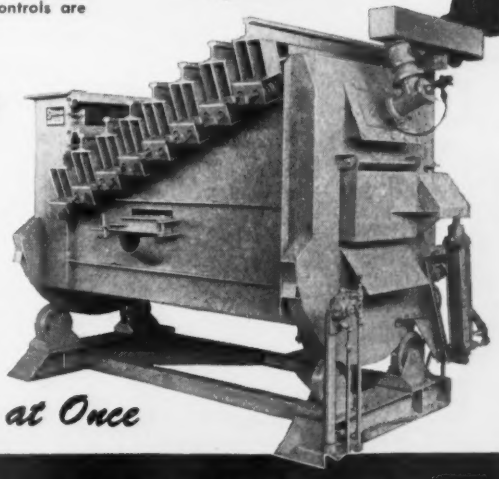
The "DS" Furnace provides a complete melting unit for each Die Casting Machine or Small Permanent Molds. It is a small compact unit that may be easily moved to any desired position in the plant. Eliminates the necessity of having both breakdown and holding furnaces. Saves over 50% in fuel costs over any other type. Ingots and returns are melted where they are cast. There is no handling of hot metal except to the die or mold. Metal is melted in a reducing atmosphere and is free from porosity with little or no dross. Complete automatic controls are available if desired.



FRONT VIEW FROM BURNER END.

STROMAN TYPE "SW" ECONOMELT REVERBERATORY FURNACE

Same as Economelt described above except that it is tilted by an air ram, and does not incorporate Stationary Lip Pour. It is excellent as a breakdown furnace for ingot and returns, in die or sand casting and permanent mold plants. Suitable for re-alloying returns or running back machine shop scrap. A large opening is provided below burner equipment to facilitate such operations as drossing, fluxing, alloying, or puddling back light scrap or returns.

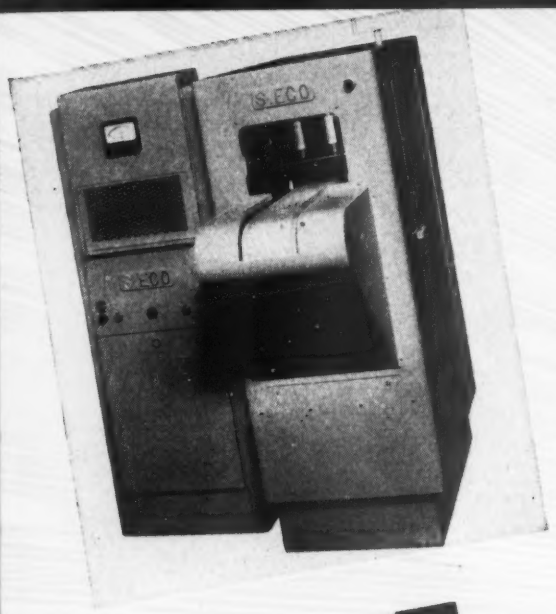


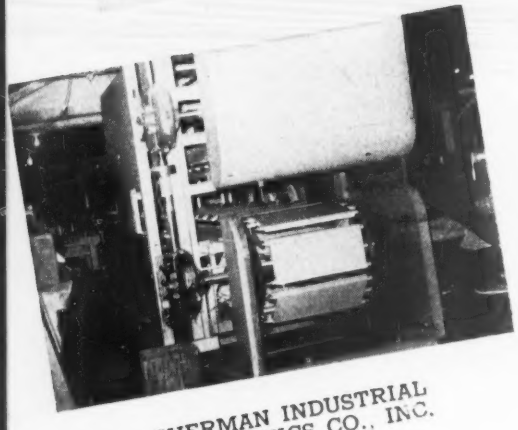
Write for Complete Information at Once

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.





SHERMAN INDUSTRIAL
ELECTRONICS CO., INC.
Belleville, New Jersey

THE GIRDLER
CORPORATION
Louisville, Kentucky

AQU

Herald the dawn of a ne

TWO new tools make the miracle of a fast ba possible—they are dielectric heat and Aqua-s Core Binders. Fast heat and fast setting binde do the job together. Now, in minutes, cores ca be baked from center to surface and that's ju the first saving. A core room which has bee modernized with Dielectric Ovens and Aqua-s continues to save on costs because:

(1) It requires less floor space to operate
(2) No oven warm-up is needed
(3) Increases core thru-put
(4) Cores cannot be overbaked
(5) Reduces radiant heat in the core room
(6) Adds to comfort and health of personn
(7) Gears core room schedules more close to Foundry needs
(8) Saves room required for stored cores
(9) Saves room required for core handlin equipment

Remember—The first core ever baked

UNITED OIL F

1429 WALNUT S

-SET

CORE BINDERS

ne lay for core room practice

(10) Lowers the cost of heat for baking

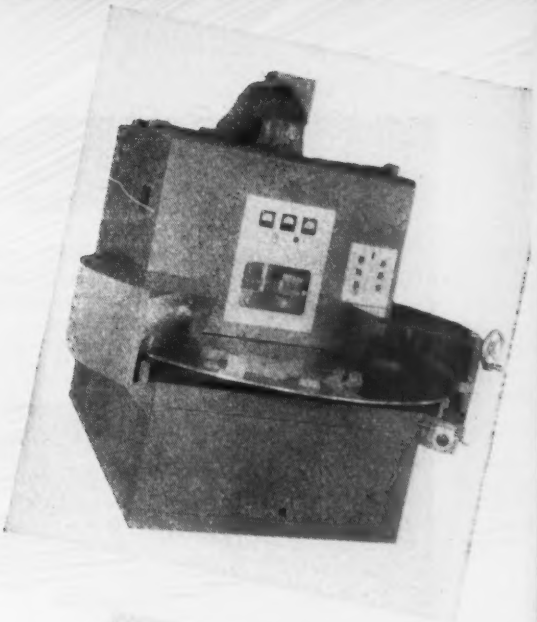
(11) Eliminates cooling cycle for cores before they can be handled and

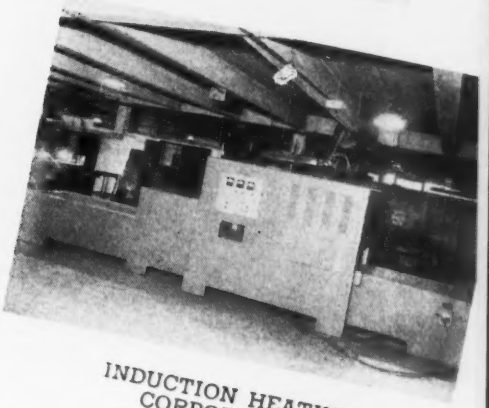
(12) Cost of the sand mix itself is often lower than when oil is used for conventional baking.

These facts are just teasers. One foundry discovered that a single man could do all the work that formerly required four. Another found that their oven could be operated under full load at only 45 cents per hour.

Do you want facts and figures on how much you could save with dielectric baking? Just write to any of the firms whose equipment is shown here and they will be glad to supply them. For data on Resin Binders designed especially for use with dielectric heat write "United" and we will be glad to supply you with our latest Aqua-set Bulletin.

lectric heat was bonded with Aqua-set.





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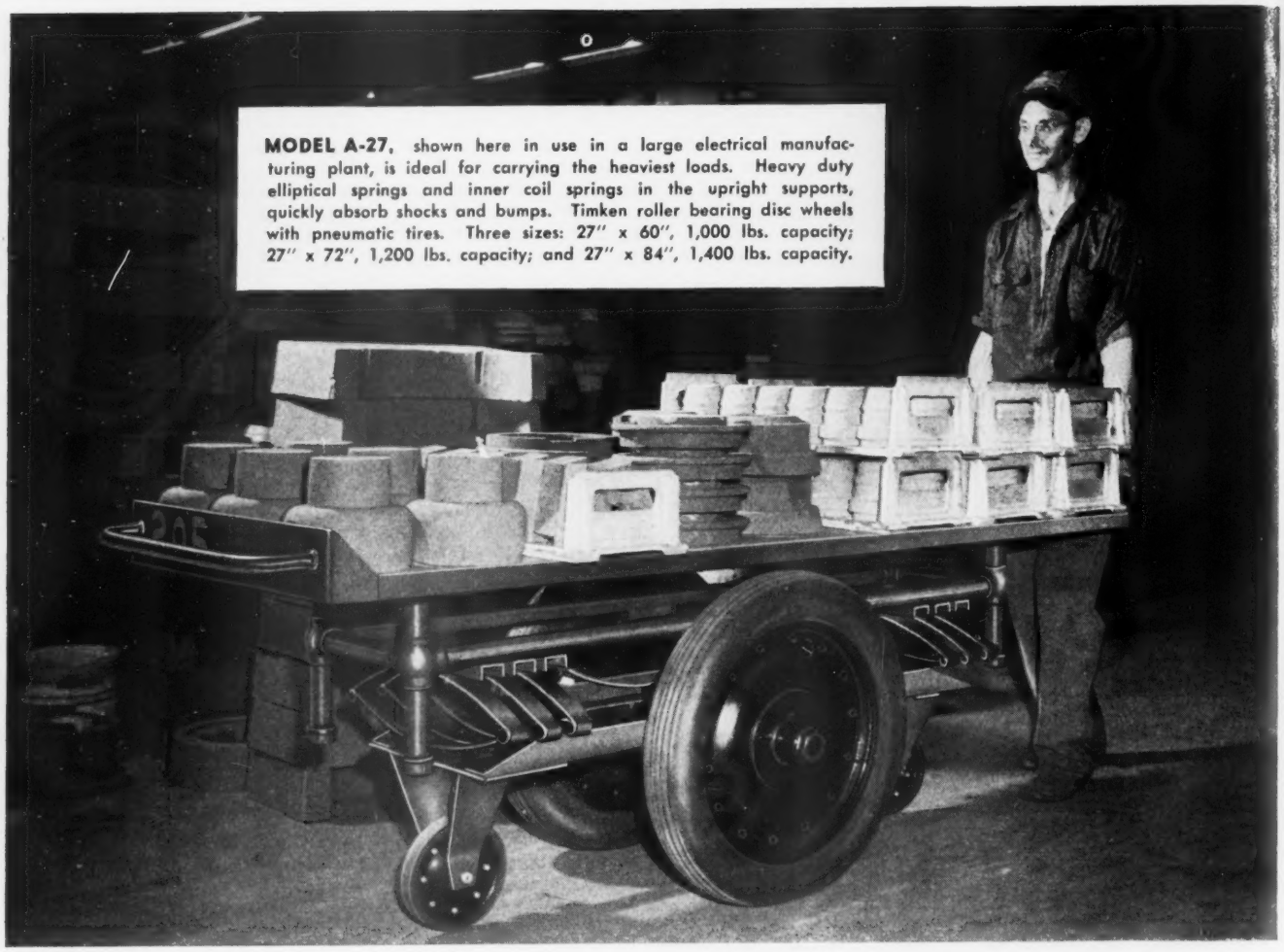


MODEL A-27, shown here in use in a large electrical manufacturing plant, is ideal for carrying the heaviest loads. Heavy duty elliptical springs and inner coil springs in the upright supports, quickly absorb shocks and bumps. Timken roller bearing disc wheels with pneumatic tires. Three sizes: 27" x 60", 1,000 lbs. capacity; 27" x 72", 1,200 lbs. capacity; and 27" x 84", 1,400 lbs. capacity.

Speed-Up Handling-Reduce Breakage

with Labor-Saving

CMD PNEUMATIC CORE TRUCKS

Resilient springs and pneumatic tires combine in these ruggedly built core trucks to *absorb* shocks and bumps *before* they reach the cores. No chafing! No breakage! CMD Pneumatic Core Trucks have been saving money for hundreds of foundries since 1925. They are available in many styles and sizes to meet every requirement with load capacities ranging from 500 pounds to 1400 pounds. They can speed up core handling for you and cut to a new low your losses from core chafing and breakage!

—THE TRUCKS WITH THE "BABY CARRIAGE" RIDE

Write for

FREE CATALOG ON CMD PNEUMATIC CORE TRUCKS, CORE BARROWS AND OTHER FOUNDRY SPECIALTIES

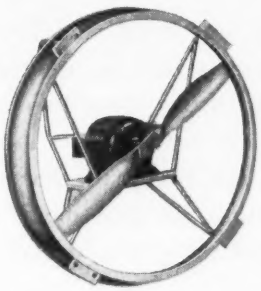
CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 11-F, 1928 West 46th Street **Chicago 9, Illinois**

POWERFUL Fans and Blowers...

AND *Your Hartzell Field Office*

PUTS HARTZELL ENGINEERING RIGHT IN YOUR BACK YARD!

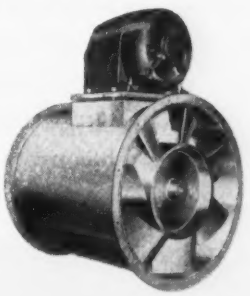


If you've got an "incurable" air-moving problem, dump it in our lap. It's for just such service that we have built our engineering-distribution system. Each of our field offices—and there's one near *you*—is there to *help you get results*, not merely to calculate the dollars and cents of a sale.

No red tape, no waiting for home-office authority Here's how: If you don't know your Hartzell office, drop us a line. A fully experienced direct factory representative will call on you promptly. He'll have full authority to work with you, make recommendations and quote costs. He can check with our home-office engineering laboratory if he needs to.

You can bank on what he tells you. That's why he's with Hartzell. And that's why Hartzell customers move air effectively at minimum cost

If you foresee an air-moving problem for the future, we urge you to call your Hartzell man in *now*. Give us all the time you can. Within the past few months we have practically doubled plant capacity, and each month we are setting new production records, but we still haven't caught up with the demand for Hartzell products.



Why the demand? It's simple. Hartzell fans and blowers move air efficiently.

CLIP AND MAIL THIS COUPON NOW FOR INFORMATION

HARTZELL PROPELLER FAN CO.
Div. of Castle Hills Corp.
PIQUA DEPT. Q **OHIO**

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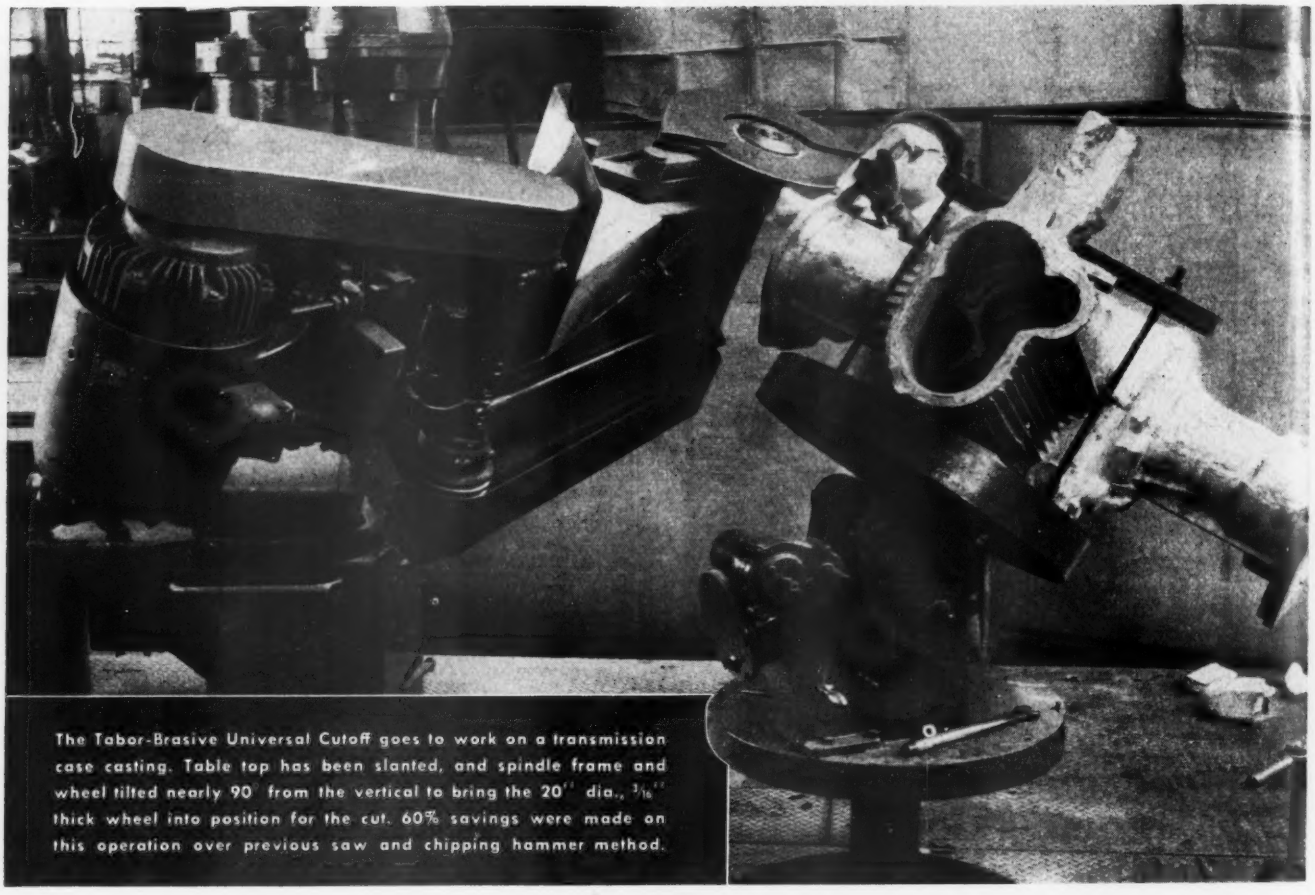
PROPELLER-TYPE FANS AND BLOWERS—ROOF VENTILATORS—UNIT HEATERS • ENGINEERING OFFICES IN PRINCIPAL CITIES



The Tabor-Brasive Universal Cutoff goes to work on a transmission case casting. Table top has been slanted, and spindle frame and wheel tilted nearly 90° from the vertical to bring the 20" dia., 3/16" thick wheel into position for the cut. 60% savings were made on this operation over previous saw and chipping hammer method.

We have abrasive cutoff machines in our blood!

How else could our staff design and build the machine shown—a giant that does almost the impossible.

It cuts gates, fins, and risers at just about any angle, from almost any shape of casting, within a 220-square foot working floor area.

"Flexibility," you ask? The main column moves back and forth. The arm swings completely around the column. The spindle frame swings 270° around the end of the arm and rotates 90° either way from vertical. The cutting table handles castings weighing up to 500 pounds. Table unit raises and lowers hydraulically and rotates 360° on its vertical axis. Table top also rotates about its center and tilts 90°. As many as four tables can be incorporated in the unit. Except for the chopping or cutting action, all movements are electrically controlled and spring-locked.

Such an example of design skill serves to reaffirm that Tabor is a good place to go for abrasive cutoff machines. Our standard line covers foundry and metalworking units—from 3 H.P. on up. Complete bulletins and data for the asking.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

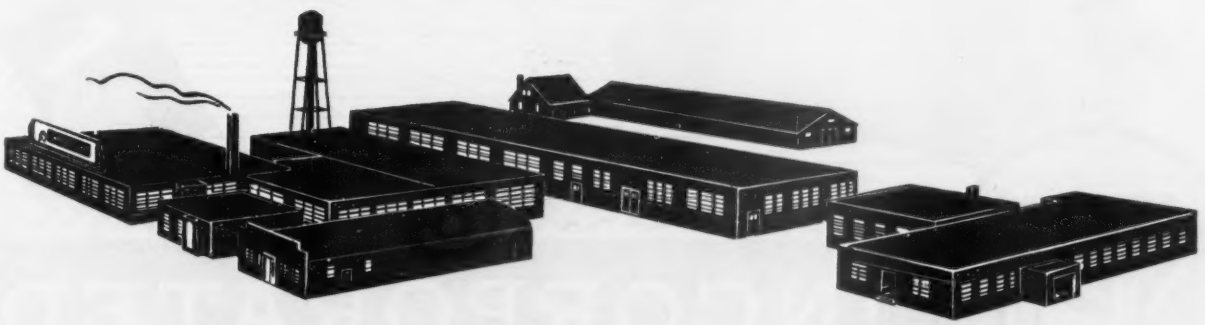
THEY'RE CUT OUT...TO CUTOFF!

EXPORT DEPARTMENT, 765 DREXEL BLDG., PHILA. 6, PA.

UNIVERSAL flask pins and bushings are typical of the quality products that have helped to build Universal's Frankenmuth plant

Universal Flask Pins and Bushings are heat-treated and precision ground from finest quality steels. They will save you precious minutes of production time by assuring instant, accurate alignment of cope and drag. Universal Flask Pins and Bushings will give you long, satisfactory service and they will stand up under extremely rough treatment, thus saving you the additional cost and down-time that replacement always requires. Universal Flask Pins and Bushings are typical of the quality products being produced at the big, modern plant of the Universal Engineering Company in Frankenmuth, Michigan.

The modern home of finer production tools



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FRANKENMUTH 4, MICHIGAN

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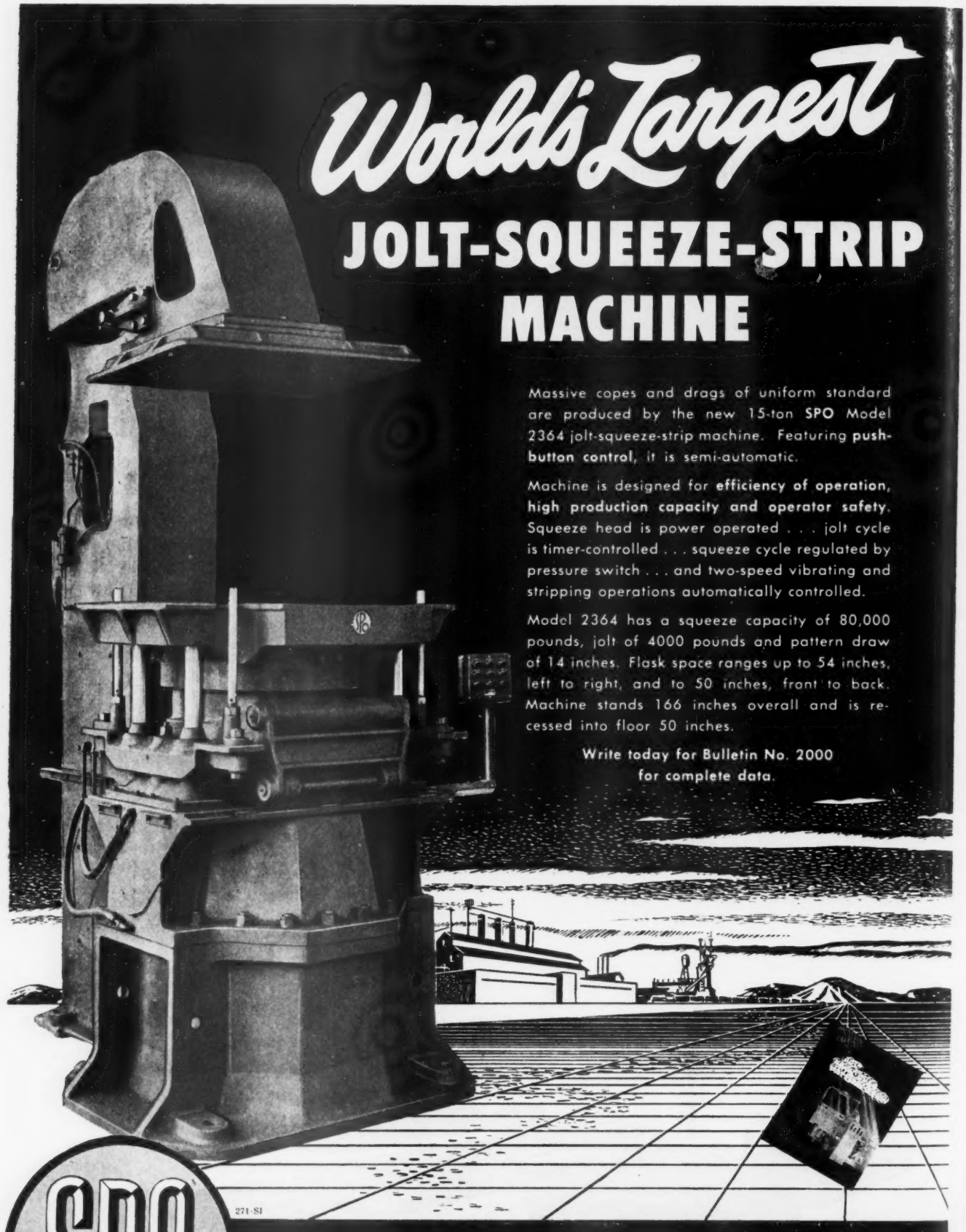
World's Largest
JOLT-SQUEEZE-STRIP MACHINE
Massive copes and drags of uniform standard are produced by the new 15-ton SPO Model 2364 jolt-squeeze-strip machine. Featuring push-button control, it is semi-automatic.
Machine is designed for efficiency of operation, high production capacity and operator safety. Squeeze head is power operated . . . jolt cycle is timer-controlled . . . squeeze cycle regulated by pressure switch . . . and two-speed vibrating and stripping operations automatically controlled.
Model 2364 has a squeeze capacity of 80,000 pounds, jolt of 4000 pounds and pattern draw of 14 inches. Flask space ranges up to 54 inches, left to right, and to 50 inches, front to back. Machine stands 166 inches overall and is recessed into floor 50 inches.
Write today for Bulletin No. 2000 for complete data.
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6449 Grand Division Avenue • Cleveland 25, Ohio

Support Your Foundry Production

WITH

SMITH L-O CORE OIL

Accelerate production, improve casting quality, and generally improve the efficiency of your core room with Smith L-O Core Oil.

Always of the same uniformity and high quality (due in great measure to controlled processing by the Dow-Therm method of heat treatment) Smith L-O is great both for production and jobbing work in all classes of casting.

Yes, support your production with Smith L-O. Order your requirements from the representative in your vicinity.

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- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
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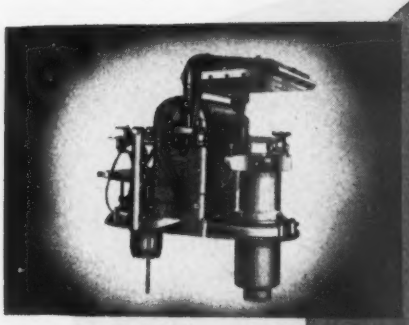
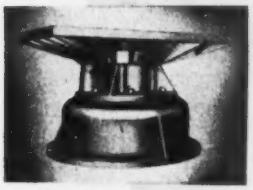
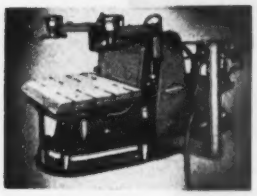


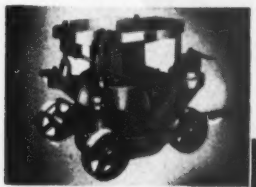
Jolt Rollover Draw
Model A



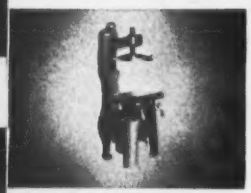
Plain Jolt
Model AJ-16



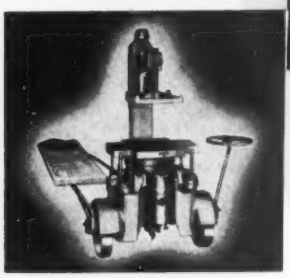
Jolt Rollover Draw
Model SA



Jolt Pin Lift
Model AJS (Portable)



Jolt Squeeze
Model 10-JX (Stationary)



Jolt Pin Lift,
Model 10-JY (portable)

OVER THE TOP

You can put your production over the top with good Davenport Molding Machines. The Davenport line will meet your requirements—over 60 sizes and styles to select from—and will fit into your type of production.

Let us send you our complete catalog. It is worth your time to take a look at the possibility of further mechanizing your molding room.

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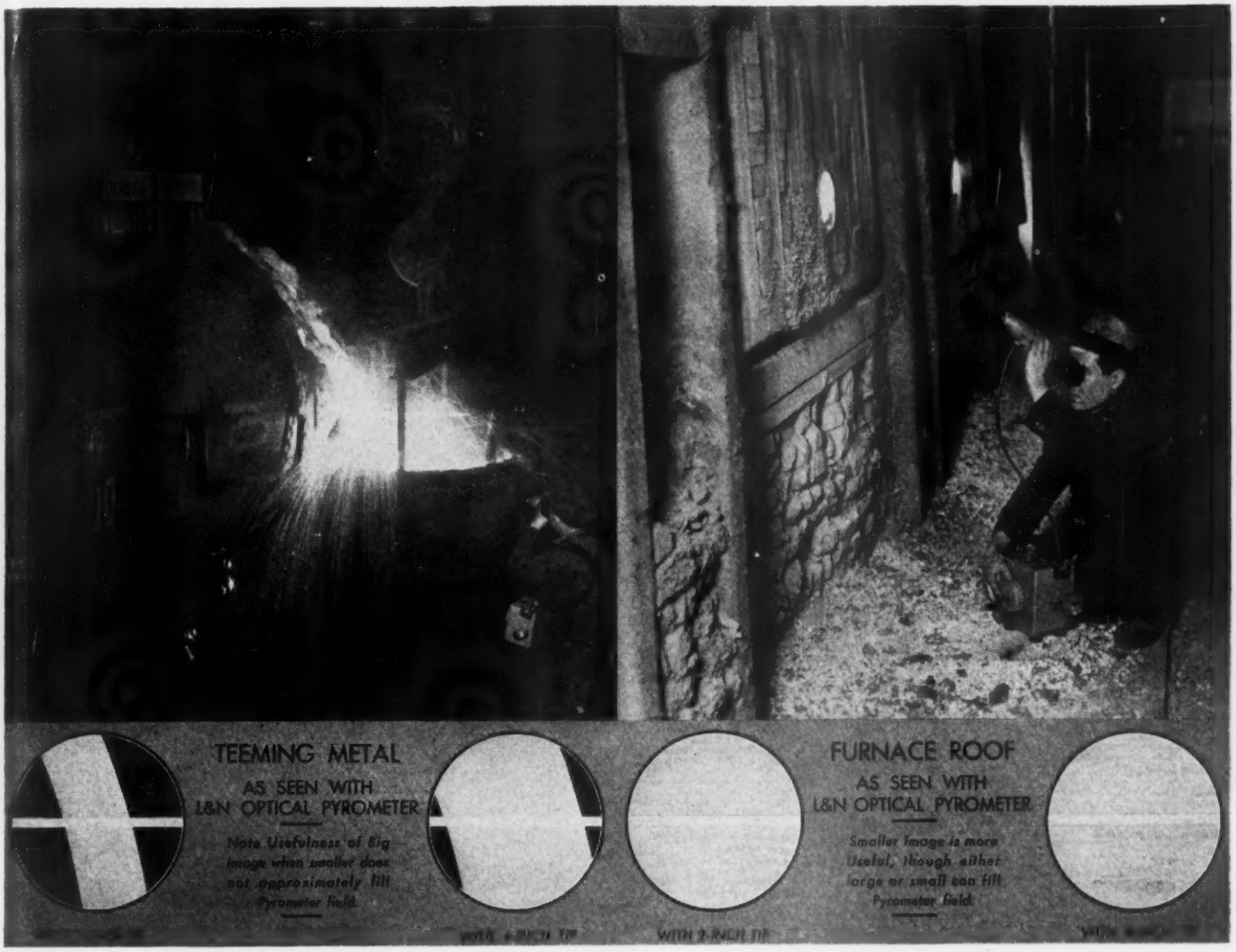
TEEMING METAL
AS SEEN WITH
L&N OPTICAL PYROMETER
Note Usefulness of Big Image when smaller does not approximately fill Pyrometer field.
WITH 2-INCH TIP
FURNACE ROOF
AS SEEN WITH
L&N OPTICAL PYROMETER
Smaller Image is more Useful, though either large or small can fill Pyrometer field.

Better Information About Temperature From Present L&N Optical Pyrometers

The important job of checking temperature by simply sighting an instrument on the hot object is the steel industry's task for L&N Optical Pyrometers. Because Opticals do not change accuracy when ambient temperature rises or falls, they can be kept handy to the furnace, ready for use at any time. Because they use the potentiometer principle, these portable instruments measure dependably and accurately. And, now, they are easier to use than ever before because the user can have two choices in the apparent size of his "target." All that's needed is a pyrometer tip of 4" focal length, to supplement the standard 2" tip.

With the 2" tip, the area seen by the user is 5½ inches in diameter at 5 feet; proportionately more or less at other distances. With the long tip, the field is the same size, but the image is twice as large, so that men who formerly had difficulty in getting readings now obtain them more quickly and with less effort.

Optical Pyrometers are available in Fahrenheit ranges from 1400 to 5200, or in the corresponding Centigrade ranges of 775 to 2800, or in convenient portions of each spread. Instruments can be direct-reading for the normal "black body" conditions inside a furnace, or for molten metals. All choices, as well as the extra tips, are fully described in Catalog N-33D, which also has many pictures showing equipments in use. For a copy, write Leeds & Northrup Co., 4917 Stenton Ave., Philadelphia 44, Pa.

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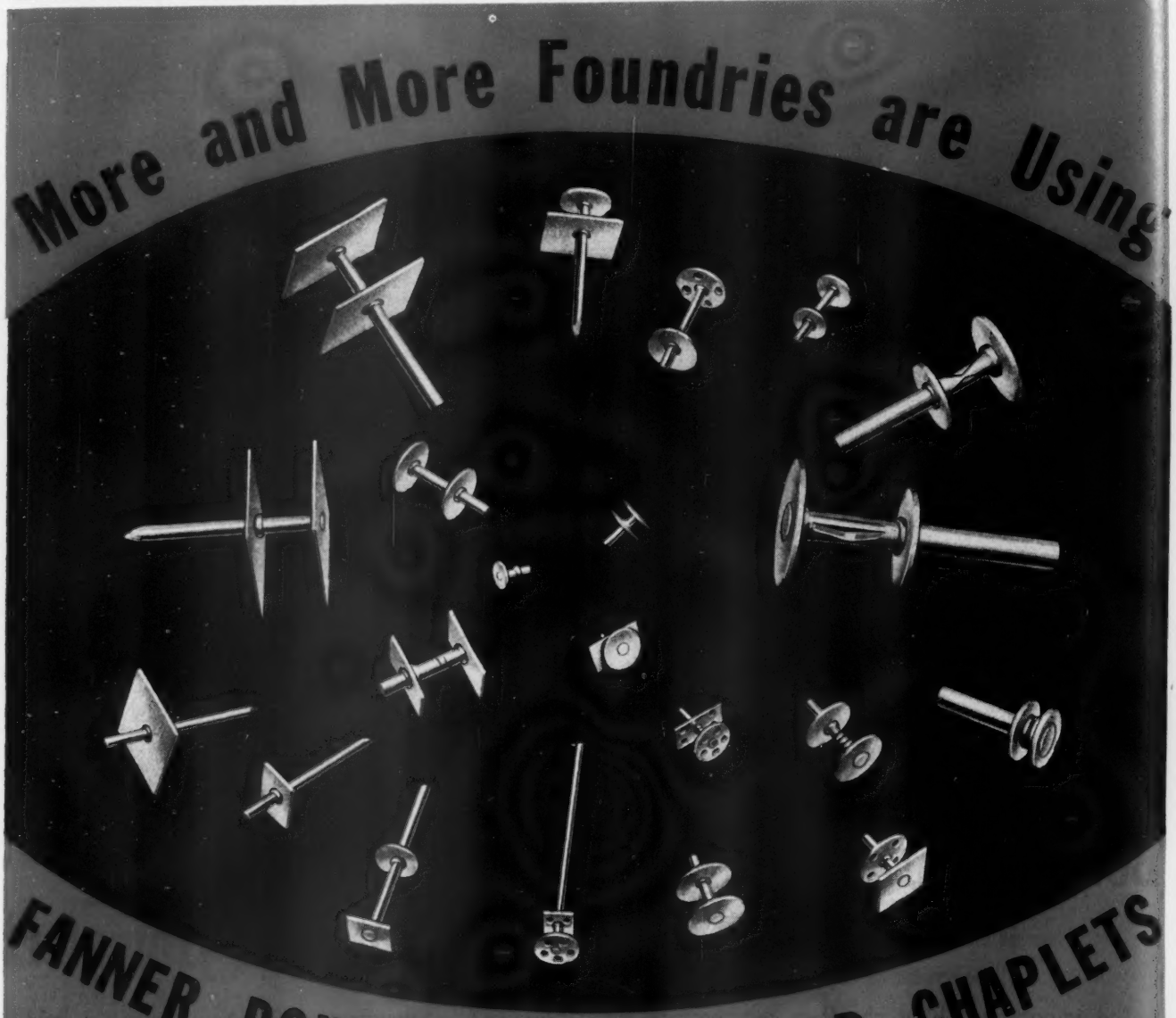
IT'S FANNER for CHAPLETS

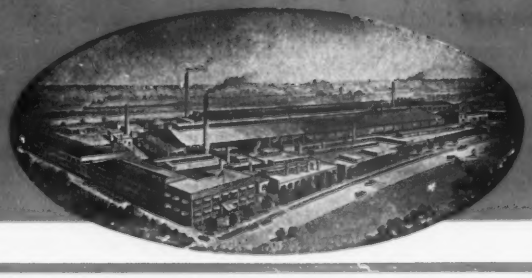
More and More Foundries are Using



FANNER DOUBLE HEAD ANCHOR CHAPLETS

Important Notice:

Two motion picture films—one on the use of Chaplets, the other on the use of Chills—are available, free of charge, for showing at Foreman Club meetings, in technical schools, A. F. S. chapter meetings, etc. Write for reservation.



These specially Fanner designed chaplets are rapidly replacing other types of chaplets in foundries the country over . . . BECAUSE THEY ARE EXTRA ADDED INSURANCE OF PRECISION CASTING.

The reason is the extended stem which serves as a definite anchor in holding the chaplet in place, keeps it from being washed away in the molten metal.

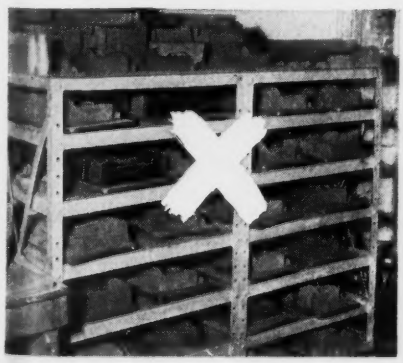
Available in tinned or coppered finish. When ordering from your jobber, always insist on Fanner chaplets.

THE FANNER MFG. CO., CLEVELAND 1, OHIO

In Canada: **CANADIAN FANNER, LTD., Hamilton, Ont. Canada**

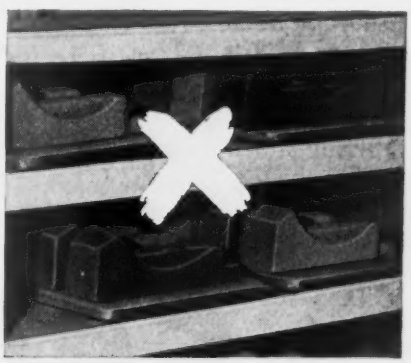
See How IT TAKES HEAT, FUMES, WASTED TIME OUT OF CORE MAKING

1 Saves drying time! Cores take minutes instead of hours to dry in this clean, modern looking Allis-Chalmers Sand Core Dryer. Cores come out cool, easy to handle, and smoke and fumes are eliminated. Dries any core that will pass through an aperture 36 inches wide and 13 inches high. Cuts fuel costs 30% to 60%.



2 No need to place cores on racks like these for cooling and curing. Cores are cool, dry, ready to use the minute they leave the *Foundromatic* Sand Core Dryer.

3 Storage space like this can be converted to production space because cores can be made up as needed. No need to store up cores and hold them for tomorrow's production.



4 Uneven baking illustrated here is eliminated. Every core dried dielectrically is uniformly dried. Burning is impossible even when there are thin sections. Practically eliminates rejects!

A-3260

Foundromatic is an Allis-Chalmers trademark.

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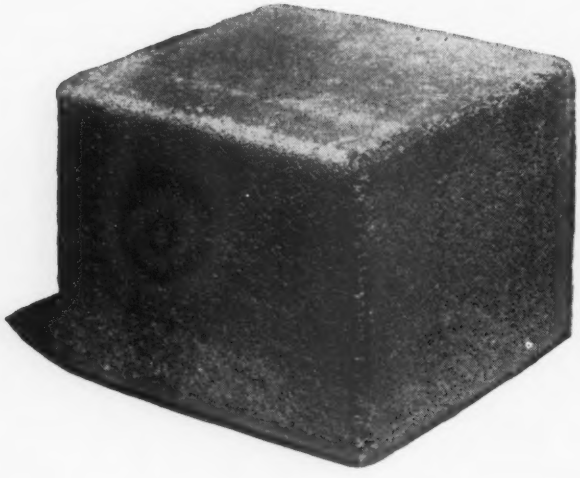
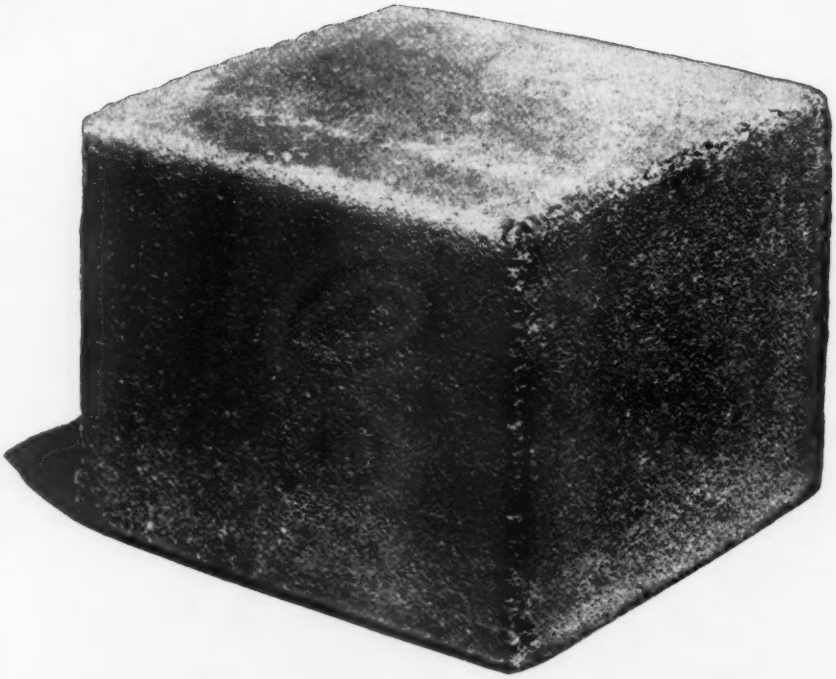
MORE EFFECTIVE DEOXIDATION



FERROCARBO
TRADE MARK
Briquettes



- Made from silicon carbide specially processed for metallurgical use.
- Readily soluble in molten iron, providing thorough deoxidation.
- Super-heated iron of greater fluidity obtained; foundry variables reduced; cleaner, sharper castings poured.
- Easily added to cupola in uniform briquettes.

by CARBORUNDUM
TRADE MARK

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● **FERROCARBO Briquettes** are manufactured under U.S. Patents 2,119,521 and 2,497,745. The process of making cast iron through utilization of silicon carbide is registered under U.S. Patent 2,020,171.

Made in Canada by the CANADIAN CARBORUNDUM COMPANY, LTD., Niagara Falls, Ontario
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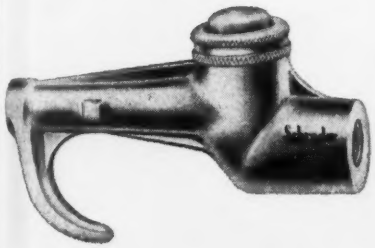
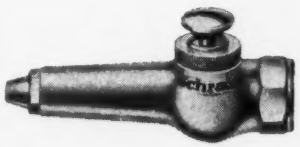
"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, N.Y.

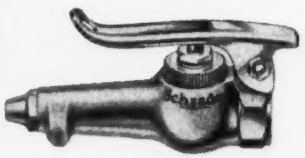
There is a Schrader® blow gun for every job



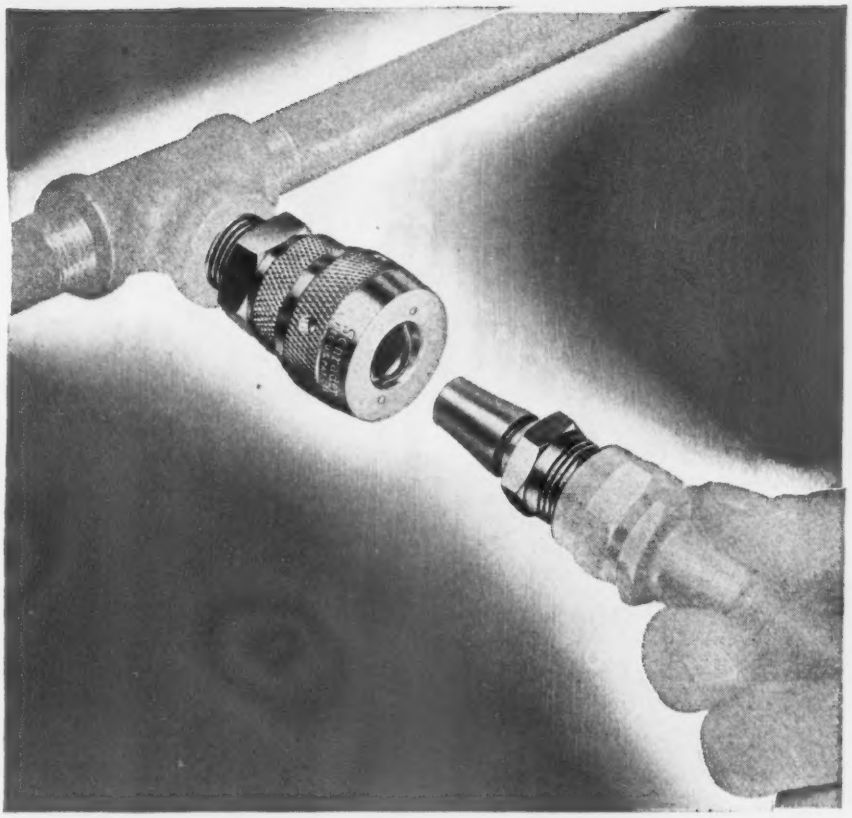
This drop forged stainless steel blow gun is designed to stand up under hard, steady use. It is practically indestructible. The stainless steel construction increases corrosion resistance and gives you a positive guarantee of longer, trouble-free service.



Button Type—This sturdy all-purpose forged brass blow gun operates at the press of a button. A popular all-round blow gun that has proved indispensable to hundreds of thousands of users.



Lever Type—A controlled flow of air, from a puff to a blast, is a feature of this precision-control blow gun. Its design and lever position provides a natural grip for thumb control of air flow.

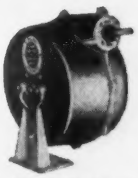


Now Compressed Air can be as convenient as electricity

With Schrader Quick Acting Couplers you can have air where you want it and when you want it—with the "plug-in" convenience of electricity. They can be installed at handy places along walls, benches or columns . . . bringing air right to the "point of work."

A quick push snaps the Schrader swivel adapter into the check unit . . . opens line pressure and locks to make an air-tight connection. It requires only a positive manual twist of the check unit sleeve to uncouple. These fittings come in a variety of adapter and thread sizes.

The Schrader Tuck-Away Hose Reel is another item for more convenient



handling of compressed air. This reel will keep air lines off the floor, reduce accidents, lengthen the life of the hose. Schrader Hose Reels are the efficient way to bring air to the work.

These are just two of the many Schrader air line fittings that can help you make air as convenient to use in your shop as electricity. Ask us to help you determine what will best fit *your* needs. Send us a letter outlining your particular installation, your idea, or fill out the coupon below.

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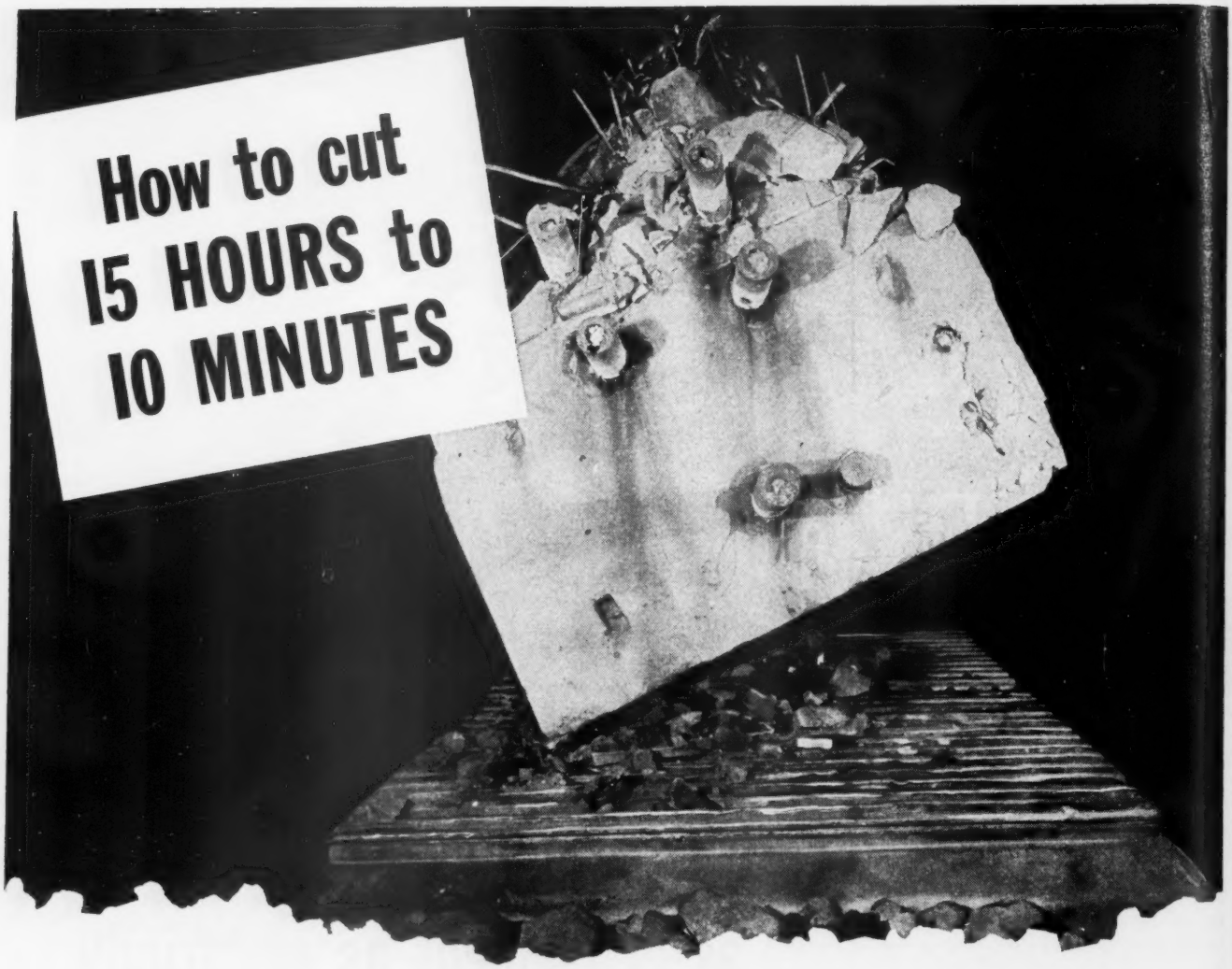

Floatex® Does It for Farrel-Birmingham

That jumbo casting is a pump casing of GA Meehanite® metal weighing over four tons. It is about to shed its cement "overcoat" in the Ansonia, Conn., plant of Farrel-Birmingham Company, Inc.

It's unique for two reasons—it was cast with cement-bonded sand . . . and that sand will be removed in ten minutes!

A Hewitt-Robins Floatex Shakeout does the trick. With an air gun, it used to take up to 15 hours!

Flasks like this are routine for the Floatex Shakeout, and there's good reason why . . . it's *designed* right and it's *built* right. Floatex is big, it's fast, yet it's gentle. It does the job by shaking the *flask*—not the foundry.

The live frame is supported by soft, heavy duty coil springs. Vibration can't escape to weaken building structures, collapse unpoured molds or jangle workers' nerves. And every inch of the Floatex deck vibrates . . . *every inch is alive.*

What's more, Floatex can do not *one* but *two* basic foundry jobs . . . flask shakeout and core knockout . . . in a single operation without removing the casting! That means only *one* investment, and twice the work from the same machine.

Hewitt-Robins Floatex Shakeouts are made in portable, stationary and self-discharging types—in sizes to handle flasks weighing a few ounces up to 100 tons and more.

Write today for Bulletin 124B. It tells the whole story. Robins Conveyors Division, 270 Passaic Avenue, Passaic, N. J.

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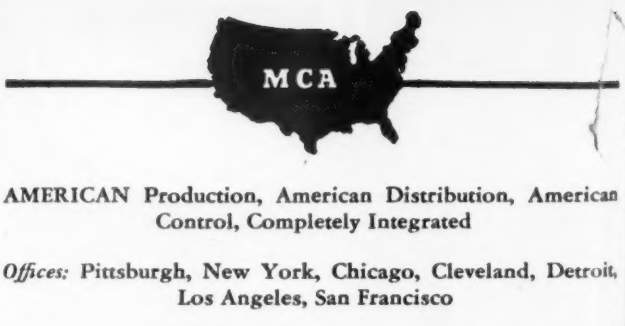

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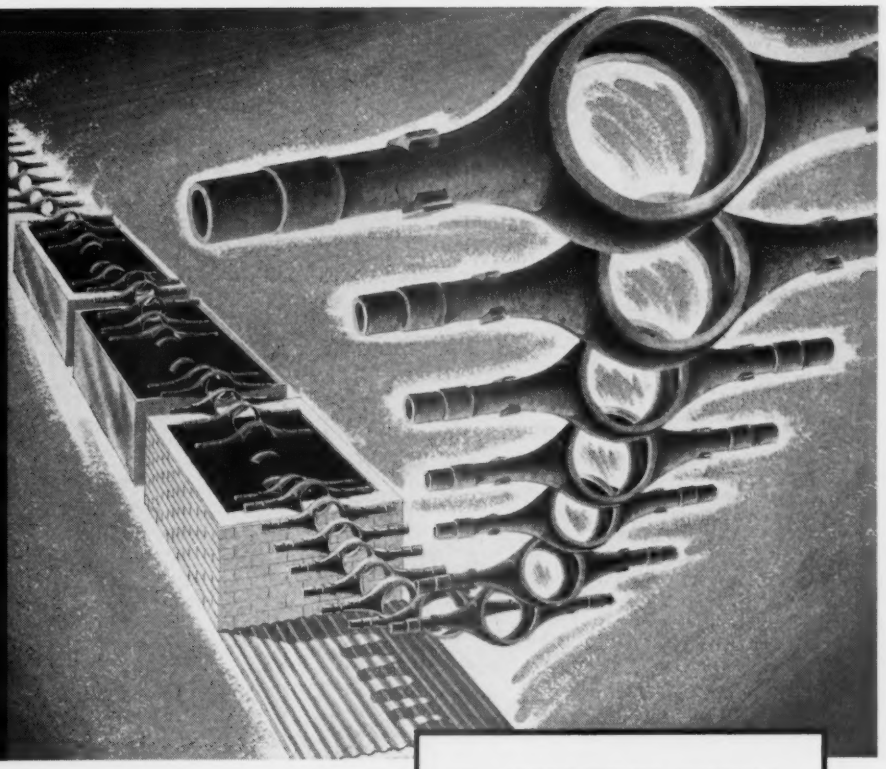

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20 times faster

THAN BY USUAL METHODS

VIRGO MOLTEN CLEANER is the new, fast, simple way to desand and degraphitize iron and steel castings. It works in *10 minutes or less*—gives you chemically clean castings, with full dimensional stability, in a fraction of the time required by conventional methods.

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A green flake salt developed specifically for companies producing and working with castings, forgings, fabricated parts.

What VIRGO MOLTEN CLEANER does:

- Desands and degraphitizes castings
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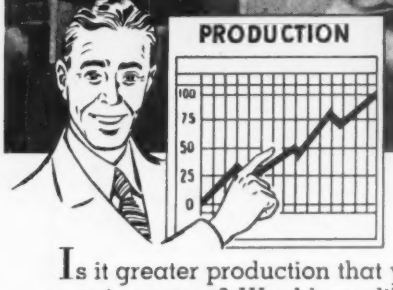
INCREASE FOUNDRY OUTPUT
WITH EFFICIENT TRAMRAIL HANDLING



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In many instances the installation of Cleveland Tramrail cranes, bridges, carriers, hoists, etc. have so cut handling time, speeded production and brought about other advantages, that 25% to 100% greater output is obtained with the same floor area.

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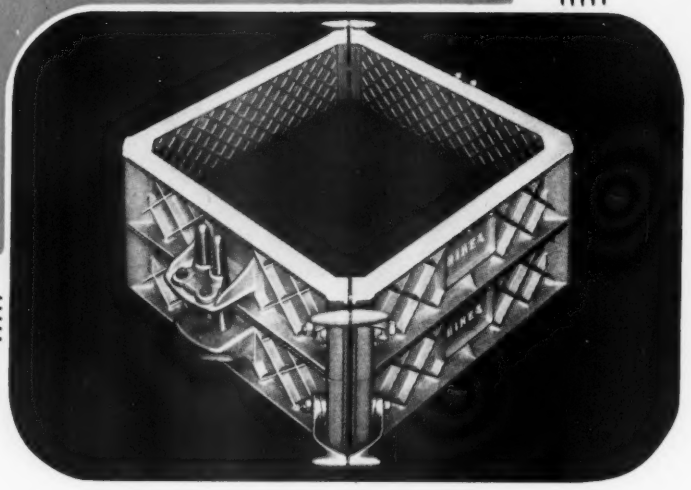

Hines "Pop-Off"* Flasks have the happy faculty for making an exceptionally high percentage of perfect molds. This big advantage, plus their trouble-free operation and long life, explains why more and more Hines Flasks can be found in leading foundries, from coast to coast.

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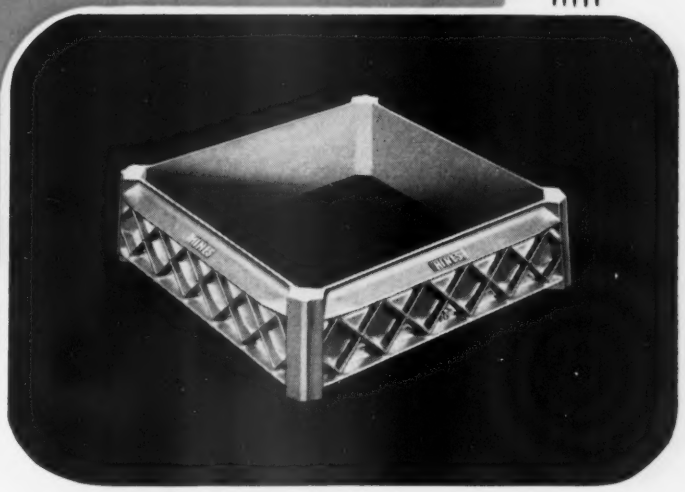


Here's the perfect team-mate for Hines "Pop-Off"* Flasks. Together they form a combination that's unexcelled for quantity production of high quality castings. If you're not already using this outstanding foundry team, why not investigate? Write or phone for information and prices.

TRADE S. PAT. OFF.

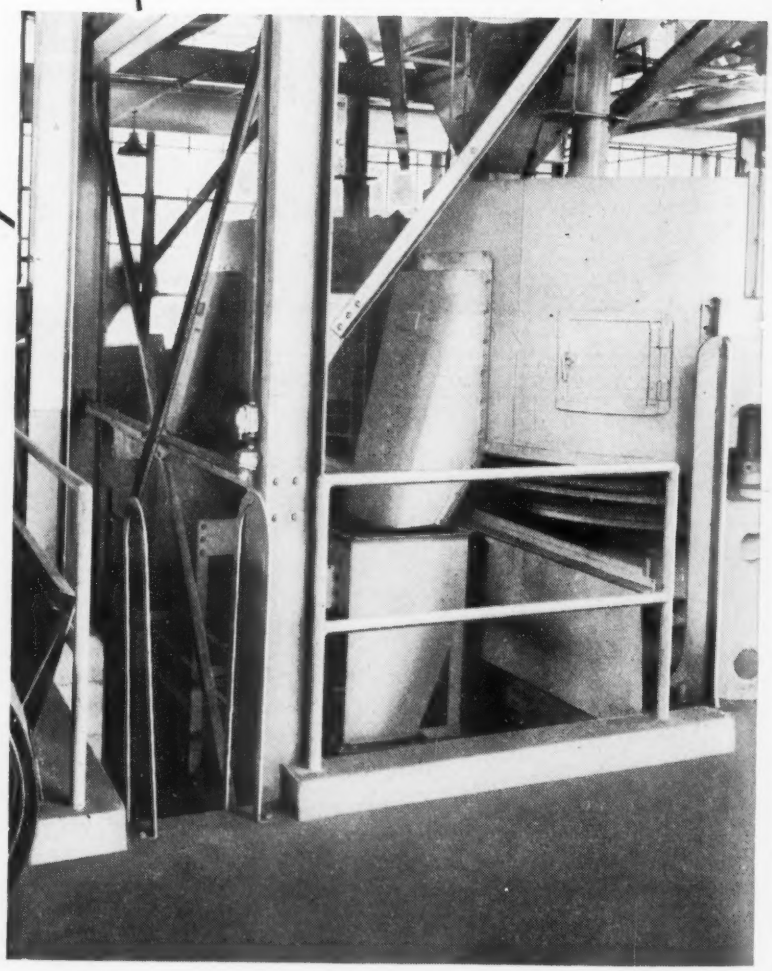
S FLASK CO.

CLEVELAND 11, OHIO

you can make SAND PREPARATION automatic

with a

CLEARFIELD MIXER



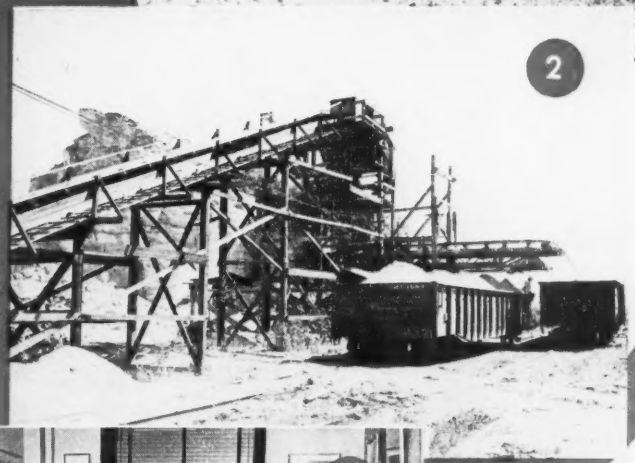
All Clearfield Mixers can be completely controlled by electric timing devices, giving you fully automatic sand preparation. You'll save time, cut costs and assure yourself of a continuous supply of sand prepared exactly as you want it when you employ a Clearfield automatic mixer.

But whether you want automatic or manual control, there's a Clearfield Mixer to provide the exact answer to your sand preparation needs. *Write today for catalog No. 79 for complete details.*

Clearfield Mixer
Mixes, Tempers
Aerates

CLEARFIELD MACHINE CO.

CLEARFIELD, PENNSYLVANIA



3 Reasons Why your sand shipment will be ON TIME

1 A capable traffic department at American Silica keeps in touch with existing car supplies and shipping conditions, carefully scheduling and routing your sand shipments so that there will be no delay.

2 The most modern equipment available keeps mining operations going at top speed. Special loading facilities make it possible to load a car in 10 minutes. Then, without delay, the conveyor shifts to the opposite track and begins loading a second car while the full car is replaced by an empty one.

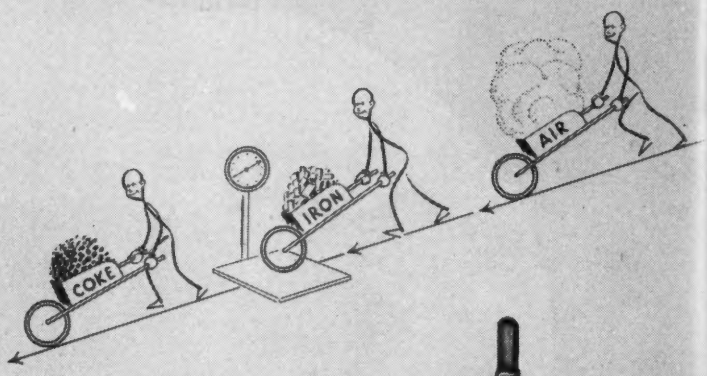
3 Three huge pitts in the Ottawa district keep a steady supply of carefully screened sand pouring into railroad cars consigned to your foundry. This combination of pit capacity, efficient methods and equipment, and careful routing give you assurance that your sand shipments from American Silica will arrive on time.

American Silica Sand Co.
OTTAWA, ILL.

Crude and dried crude silica sand
SULTRON® flux
Australian zircon sand
Zircon flour

®*SULTRON* is the trademark of Westvaco Chemical Division, Food Machinery and Chemical Corporation, for its brand of sodium sequicarbonate.

Foundry costs come down

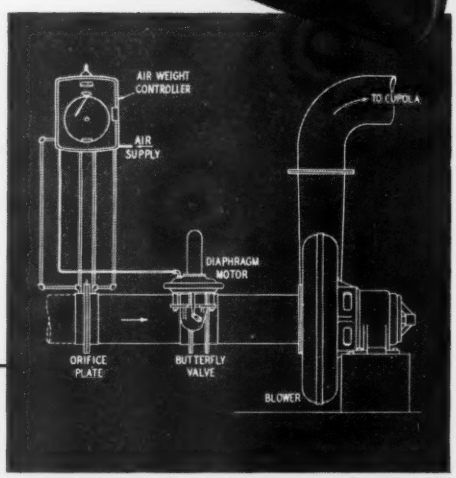


. . . when you weigh air too

Leading foundries report lower fuel costs, fewer rejects, and less pigging after installing Foxboro Air Weight Control. That's because the cupola blast is fully compensated for every change in atmospheric pressure and temperature. *The right amount of oxygen for the quantity of coke charge* insures better combustion, more uniform heats and better quality castings.

Foxboro Air-Weight Controllers automatically control cupola blast by *weight of air* instead of volume. They are one of Foxboro's many original developments in instrumentation to cut industrial costs. Representative installations will be found throughout the foundry industry. The names of those located nearest you will be gladly sent on request.

Now, . . . you can make the most of modern foundry practice by installing the advanced-design Model 40 Air-Weight Controller by Foxboro. Installation is easy and fast. Results will far outweigh the investment. Write for complete details. **The Foxboro Company, 3211 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities.

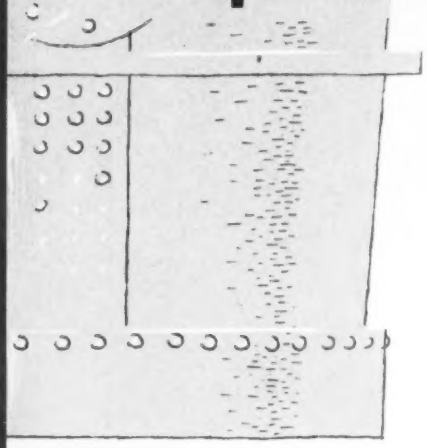


Typical installation set-up of Foxboro Air-Weight Control . . . readily adaptable to either a centrifugal blower (shown in diagram) or a positive displacement blower.

FOXBORO REG. U. S. PAT. OFF. **AIR-WEIGHT CONTROLLERS**

. . . For the Metal Processing Industry

Norton *Special* Refractories Are Engineered To Fit Your Exact Requirements



You are always looking for new ways to improve your products, increase your production and lower your costs. That's why you'll find a valuable partner in Norton Refractory Research.

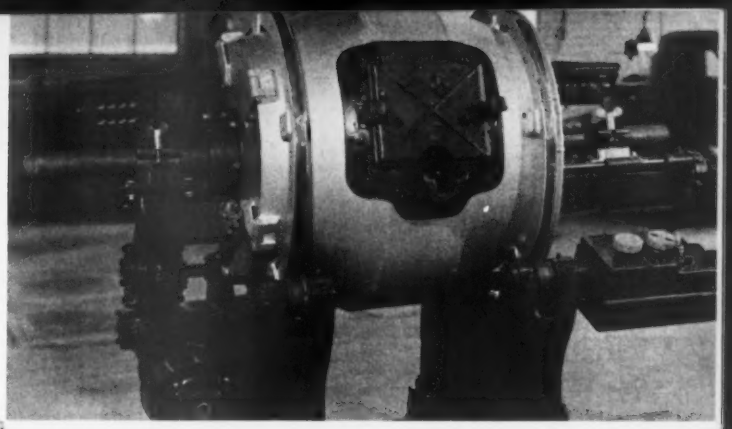
For 40 years, Norton Research has pioneered in the development of special refractories for high temperature applications that are complicated by chemical, electrical, and physical variables.

Working with many electric furnace products, Norton Research has created a wide variety of special refractories having properties of great value in metal processing. These are CRYSTOLON* (silicon carbide), ALUNDUM* (fused alumina), MAGNORITE* (fused magnesia), and FUSED STABILIZED ZIRCONIA. A few of these products are discussed here. For more complete information, call your nearby Norton refractories engineer, or write Norton Company, Refractories Division, Worcester 6, Mass.

IN HIGH FREQUENCY INDUCTION FURNACES, you can melt more steel as well as heat- and corrosion-resistant alloys per lining using Norton MAGNORITE cement. Designed specifically to be rammed dry, it begins to mature at 2100° F. and withstands temperatures up to 3250° F. Only the inner face matures during the wash heat, thereby eliminating shrinkage cracks which permit metal penetration that can short out your furnace. MAGNORITE crucibles are available for smaller furnaces.

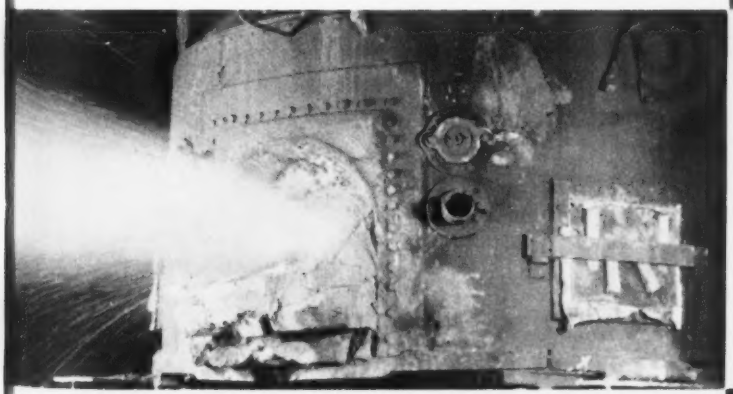
For melting platinum and its alloys Norton FUSED STABILIZED ZIRCONIA crucibles are ideal. Since they are not wetted by the metal, you recover 100% of the melt without destroying the crucible and can also use the same furnace for different alloys without contamination.

IN INDIRECT ARC FURNACES you'll get the results you want with Norton ALUNDUM and MAGNORITE crocks and covers or cements. As these products are made to meet individual requirements, send us your specifications for the recommendation that will assure you the most satisfactory results.



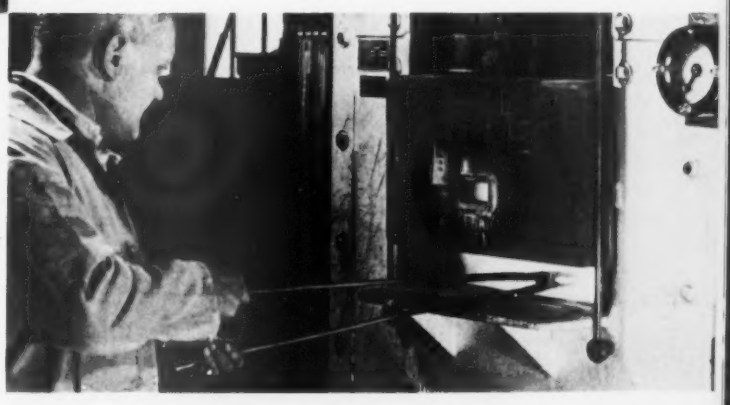
IN LOW FREQUENCY INDUCTION FURNACES, you have a choice of ALUNDUM and MAGNORITE cements, depending upon the metals you are melting. Long lining life is obtained in melting the refractory alloys, including cupronickel, nickel silver, high copper alloy, as well as Al, Te, and Si bronzes, because of the great refractoriness of these cements. Greater economy is also realized because of their high rammed density which resists metal penetration and erosion.

IN PIT, CRUCIBLE, AND REVERBERATORY FURNACES for nonferrous melting, linings of Norton CRYSTOLON cements and fired shapes let you melt more metal with fewer interruptions for maintenance. Fired shapes of CRYSTOLON refractory are also available for special applications. For example, CRYSTOLON protection tubes are being successfully used for more accurate control of metal temperatures.

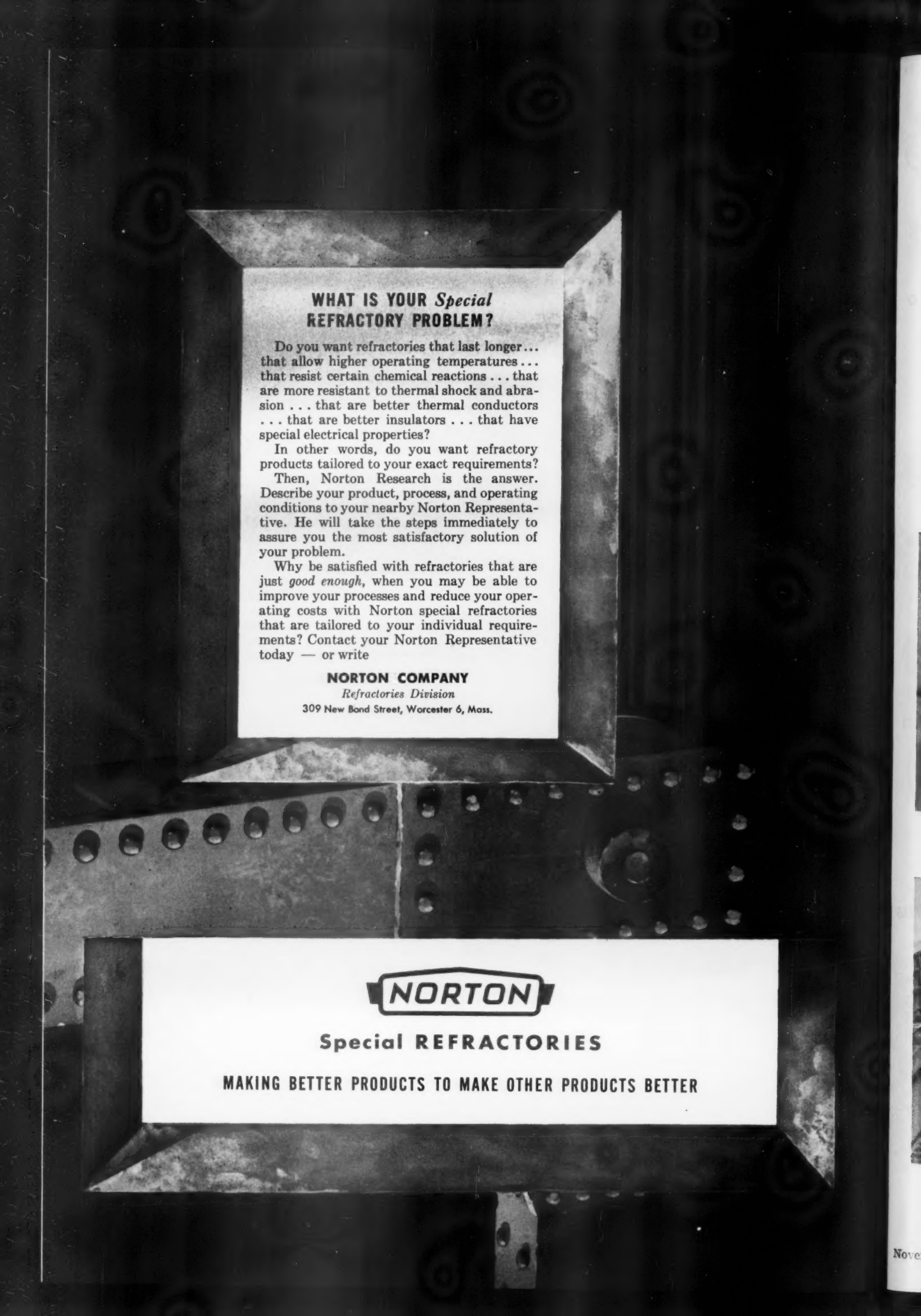


IN BACK-SLAGGING CUPOLAS, slag hole blocks made of Norton CRYSTOLON refractory enable you to complete your campaigns without stopping for replacement. Made of densely bonded, chemically inert silicon carbide grain, they resist corrosion, erosion, and penetration of slag many times longer than fireclay blocks. No softening or spalling at temperatures up to 3050° F. It will pay you to compare Norton CRYSTOLON slag hole blocks with whatever you are now using.

IN HEAT-TREATING AND SINTERING FURNACES, a wide variety of Norton refractory products are contributing to higher operating temperatures and lower operating costs. ALUNDUM and CRYSTOLON hearthplates, pier brick, burner blocks, muffles, muffle plates, skid rails, burner tunnel cements, and embedding cements offer such desirable properties as high refractoriness and excellent resistance to spalling, corrosion, and erosion.



WHATEVER YOUR REFRACTORY APPLICATION, Norton Research assures you the most practical application of special refractories to your individual requirements.



WHAT IS YOUR *Special* REFRACTORY PROBLEM?

Do you want refractories that last longer... that allow higher operating temperatures... that resist certain chemical reactions... that are more resistant to thermal shock and abrasion... that are better thermal conductors... that are better insulators... that have special electrical properties?

In other words, do you want refractory products tailored to your exact requirements?

Then, Norton Research is the answer. Describe your product, process, and operating conditions to your nearby Norton Representative. He will take the steps immediately to assure you the most satisfactory solution of your problem.

Why be satisfied with refractories that are just *good enough*, when you may be able to improve your processes and reduce your operating costs with Norton special refractories that are tailored to your individual requirements? Contact your Norton Representative today — or write

NORTON COMPANY
Refractories Division
309 New Bond Street, Worcester 6, Mass.

NORTON

Special REFRACTORIES

MAKING BETTER PRODUCTS TO MAKE OTHER PRODUCTS BETTER

To meet every INDUSTRIAL X-RAY NEED

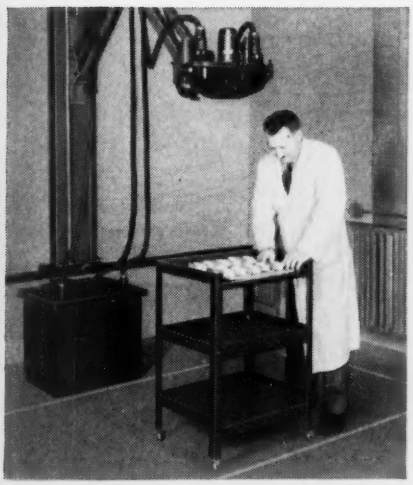
There's no need to improvise or compromise when you buy a General Electric Industrial X-Ray Unit. The comprehensive GE line makes possible the selection of just the right unit to match the type of inspection desired throughout your manufacturing process.

More than a half century of x-ray development, including the pioneering of industrial x-ray apparatus, is reflected in this highly versatile array of industrial x-ray units. Chances are, there's a need for x-ray in your business. Lower your production costs and improve quality. Let one of General Electric's highly-trained application specialists appraise your inspection needs. For full information write — X-Ray Department, General Electric Company, Milwaukee 14, Wisconsin, Box YY-11.

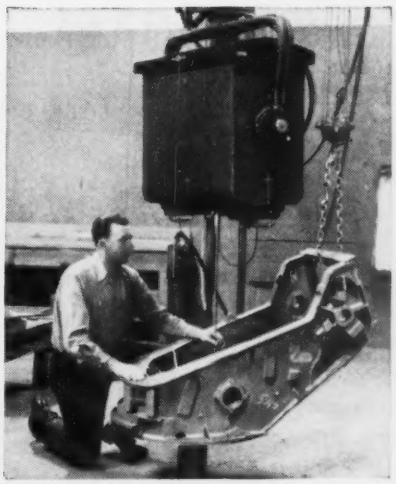
You can put your confidence in –

GENERAL ELECTRIC

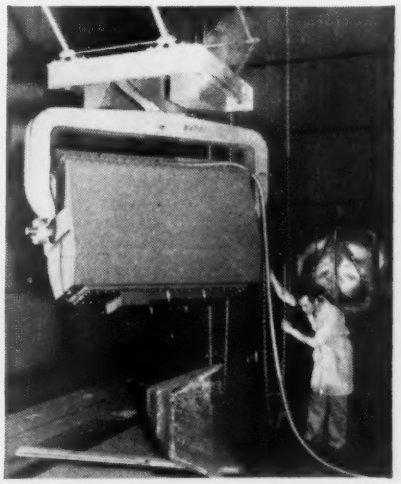
XRD-3—This x-ray diffraction apparatus provides for the use of modern techniques for the study of crystal structures and the relation of these structures to the physical properties of nearly all solid materials.



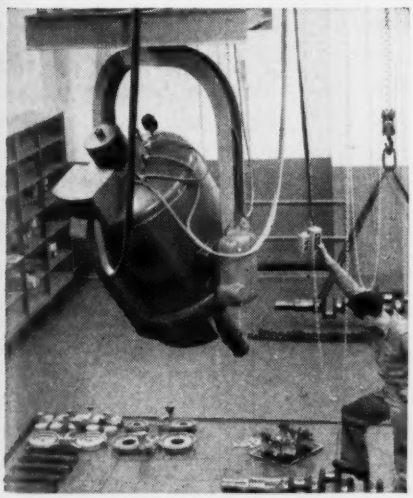
OX-140 — Extremely versatile and efficient . . . with a continuous operating range of from 30 to 140 kvp at 5 to 10 ma. Available in six different models. Invaluable for inspection of low-density metal and other materials.



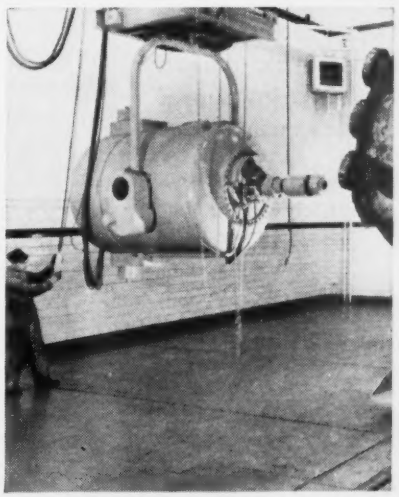
OX-250— The world's most popular industrial x-ray unit . . . with an operating range from 60 to 250 kvp, 2.0 to 10.0 ma. This rugged unit is available in seven different mountings to meet varied industrial needs.



OX-400 — Bridges the gap between low and high-voltage equipment. Where cost prevents installation of higher-voltage equipment, yet penetration of lower-voltage units is insufficient, this 400 kvp apparatus is a natural choice.



RESOTRON 1000 — The million-volt unit which opened a new era in industrial radiography. Featuring a resonant transformer, multi-section tube, and gas insulation, it operates at 1000 kvp, 3.0 ma, continuous rating.



RESOTRON 2000 — As with the Resotron 1000, this two-million volt unit permits the use of the large-field, reflected x-ray beam for simultaneous radiography of many objects in a single exposure . . . Faster, with greater penetrating power.

15 MILLION-VOLT BETATRON — The present-day ultimate where maximum sensitivity is paramount. Your best choice in magnetic accelerators, for speed, sensitivity, and field size for the radiography of heavy-section thicknesses.

The most economical mover of metals available

DINGS NEW LIFTING MAGNET
Improved these ways . . .

BIG IMPROVEMENTS LIKE: moisture-proof, shock resistant all welded construction • A finer insulating compound—vitally important because of its ability to dissipate strength-sapping heat • Four point chain suspension—another Dings exclusive—for less swinging and tipping, bigger loads and much better all around control • *Scientifically balanced magnetic circuit*—the crux of a great magnet—means all magnetic strength into the lift. Proof of this lies in the extremely low heat rise.

LITTLE IMPROVEMENTS LIKE: protector plate guards, waterproof, shatterproof, jerk resistant molded neoprene neck cable connectors, tamperproof sealed terminal box and many, many others.

THEY ALL ADD UP TO: the new Dings lifting magnet—successfully designed for lighter weight, bigger payload and longer life.

LIGHT!

IN PROPORTION TO LIFT!

MOISTURE-PROOF!

IT'S ALL WELDED

A COOL OPERATOR

LOW HEAT RISE MEANS MORE LIFT!

TROUBLE-FREE!

A DOZEN NEW FEATURES KEEP IT THAT WAY!

Get Details on Why This New Dings MOVES MORE, FASTER, AT LESS COST. Send Now for the Lifting Magnet Catalog.

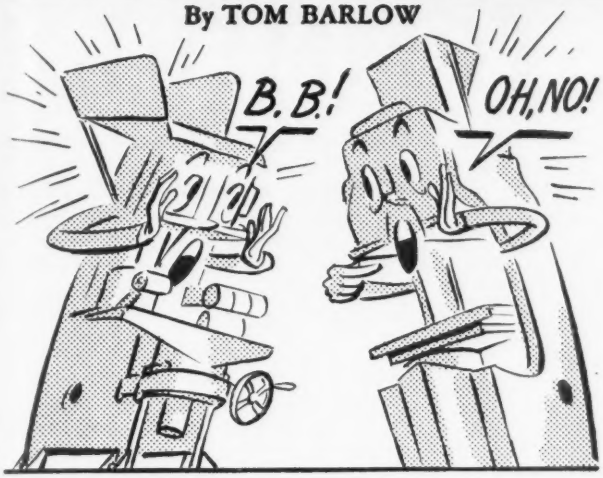
DINGS MAGNETIC SEPARATOR COMPANY
4708 Electric Ave., Milwaukee 46, Wisc.

Dings Magnets

World's Largest Builder of Electric and Non-Electric Magnetic Separators for All Industry

LET'S KICK IT AROUND

By TOM BARLOW



"Production's low, it seems always;
Money comes, but never stays;
My friends don't tell me," you lament.
Then study this advertisement.

—Ignominious

Do you own or operate a core blower? If not, you might as well turn the page, brother, because you are wasting valuable time reading this page. On the other hand, if you do have a core blower, keep reading and learn how to save your company some bucks.

Oh, so you own or run a core blower (I see you are still reading). The next question, then: Did you ever stand beside the machine when it was running? Get any on you? That, my friend, is B. B. (blow-by). It's messy, it's dangerous, it's expensive and it's strictly unnecessary.

Funny how we humans put up with unnecessary inconveniences when we don't have to. Why have your friends whisper behind your back, "His core blower has B.B."? Why not do something about it? I don't mean to just turn your back each time she blows, so you don't get it in the eye. I don't even mean to hang one of those decorative curtains of old burlap sacks around the machine columns. Those may keep the sand out of your eye, but they don't avoid wearing out the core box. No! Instead, just tell the pattern maker to rig all blown boxes with Dura Rod, Dura Strip or Dura Sheet. Goodbye, blow-by! "Ah, that is very good", you say, "but who is going to pay for these gadgets?" Fortunately, they pay for themselves—but many times, many times. Watch!

Every time sand blows by the parting or face of a core box, part of the core box goes with it. Pretty soon nice grooves are worn in the box face. Then you have a good-sized repair bill. On a high production job, you may need duplicate boxes to put into operation while the repairs are being made. Some jobs use three sets of core boxes; one on the blower, one in the pattern shop, and one ready and waiting. If repairs were less frequent or could be made quicker, a complete set of boxes could be saved. Brother, that ain't hay—not today. But even if the box has an intermittent run and there is time for repairs, you can't put that box in the pattern shop for free.

Aside from the wear caused by blow-by, there are two other spots that cost you money. One is the blow-tube and the other is the spot underneath the blow tube. You know how fast they sand blast out on a long run job, but did you know that Dura Tubes and Dura Buttons will withstand the abrasion *thirteen times longer than steel* (to say nothing of aluminum)?

OK, we can assume that Dura Products save money because they resist wear better than does metal, but that's just the beginning. Today, time is money and Dura saves time. Can you change blow tubes in less than 30 seconds? Can you repair the worn spot under the blow-hole in less than one minute? No wonder we ship Dura products all over the world. They save money and time in the core room and in the pattern shop.

Now for the premium—the free dishes for ladies. Dura Tubes save time in blowing, actually speed up production! You know those little things that are left on top of a core after it's blown? I can't write the words usually used to describe them, but they look like little lighthouses on a sandy beach (among other things). With Dura Tubes, those things aren't there, so the core maker doesn't have to brush them off before he sets the dryer. One less motion per core; one hundred less motions per hour; 800 less motions per day; 4000 less motions per week. *Shall we go on?*

All that talk about motion is making me tired. Thank goodness, I start on my vacation tomorrow. When I get back, just drop me a line and I'll send you a description of the 18 standard sizes of Dura Tubes plus the many Dura Buttons, Dura Rods, etc. Got to blow—bye, now.

★ ★ ★

EASTERN CLAY PRODUCTS, INC.

"Bonding Clays Sold With Service"

JACKSON, OHIO

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

with a

Cleveland AIR VIBRATOR

TYPE "SA"

FREE up your pattern, with a Cleveland Type SA air vibrator, to assure easy draw.

TYPE "F"

FREE up your plugged sand in bins, chutes, screens and hoppers, with a Cleveland Type F air vibrator.

FREE that sticky condition at the shakeout, with a Cleveland Type LSH hook type vibrator.

TYPE "LSH"

FREE production dividends, with the Cleveland Type C air vibrator on molding machines. Fast, easy pattern draw.

TYPE "C"

FREE time, free materials, and freedom from worry are direct results of using *any* Cleveland air vibrator.

Write for full details.

THE CLEVELAND VIBRATOR COMPANY

2789 Clinton Ave. • Cleveland 13, Ohio

Reader's COMMENT

Investment Casting

TO THE EDITORS:

Before being called back to active duty with the Marine Corps, I was foreman of the precision investment casting department at the Watervliet Arsenal, Watervliet, N. Y. I read your magazine every month and obtained a lot of very good information from it. Being away like this I have no opportunity to read your magazine. I would appreciate very much if you would send me any articles that have appeared since the first of the year dealing with precision investment casting.

LEONARD C. JOHNSON
Sergeant, U. S. Marine Corps
Cherry Point, N. C.

* * *

Shape of Skull Crackers

TO THE EDITORS:

Upon reading your reply to a reader regarding the proper size and shape of a cast iron ball for breaking scrap, the writer wishes to pass along the following comments.

During the serious pig iron situation right after the past war, the writer was associated with a foundry in Pennsylvania that had to purchase large quantities of scrap in order to keep in operation. We were seriously handicapped in processing large pieces of scrap for lack of facilities. Our first ball weighed approximately 1000 lb and was raised to a height of 18 to 20 ft by an electric hoist and then released by a line attached to a hook in the form of ice tongs.

This first cast ball was nearly spherical in shape and the worn and flat bottom was not efficient in breaking certain types of scrap, particularly engine blocks. Later acquisition of a pear-shaped 1200-lb ball proved more successful. We also found that, in breaking engine blocks, a sharp blow transmitted over a small area had a tendency to cleave the engine block in two with a minimum number of blows. To concentrate the blow over a narrow area, a piece of pig iron or narrow steel bar was placed on the scrap directly at the point where the ball was calculated to strike.

But if your reader in casting the ball that he desires keeps in mind the pear shape where the entire weight of the ball is concentrated over a small area, he will have the best success. In my mind, the square ball is highly undesirable. The square corners will eventually wear away and the ball is harder to control. The connecting eye in our ball was attached to the inside of the cavity on the top of the ball to which was attached a short piece of heavy chain. If the ball struck off angle or bounced off the scrap, no damage was done to the ring or eye.

Regarding the analysis that you recommended in the September issue of FOUNDRY, the writer never had the cast iron ball analyzed but feels that the 50 per cent steel would be sufficient for toughness.

S. S. BRUBAKER JR.
Foundry Superintendent
Steel Heddle Mfg. Co.
Southern Shuttles Division
Greenville, S. C.

* * *

Wants List of "Yankee Words"

TO THE EDITORS:

We receive FOUNDRY regularly and are very much interested in articles on foundry technique. These and other articles are very useful to us, not forgetting the ones by Pat Dwyer on "Bill."

The object of this letter is to ask if you have a list of foundry words—known here as "Yankee Words"—with their definitions. Words such as "spalling," "sintering," etc. and many others do not appear in the dictionaries we have or else give explanations not correctly applicable to their intended use.

If you could supply us an authentic list of your technical terms with definitions, it would help us to synchronize our work with yours. I might add that in our language also we have words for which you would not find the correct definition in the dictionary.

RAOUL MEUNIER C.
Foundry Technical Engineer
Fabrica de Cemento de "El Melon" S.A.
La Calera, Chile

Editor's Note: We have a limited supply of a 32-page "Glossary of Foundry Terms" available to readers for the asking.

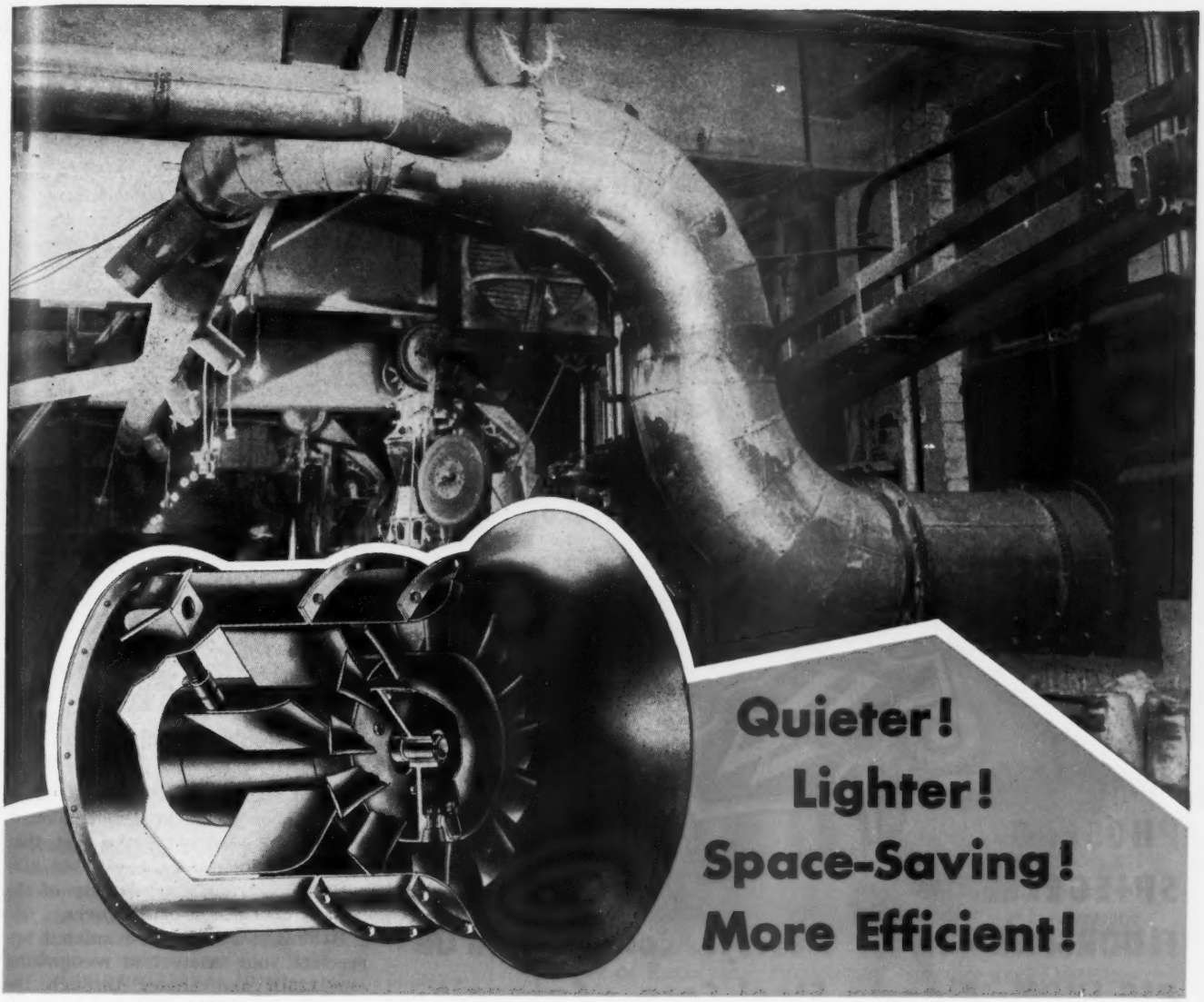
* * *

Active in Shell Molding

TO THE EDITORS:

Your editorials are always constructive and timely. The April and September editorials of this year are of especial interest to us.

(*Concluded on page* 84)



JOY AXIVANE* FANS

(SERIES 1000)

Write for Bulletin, or

Consult a Joy Engineer

The quieter operation, lighter, more compact design, lower power consumption and unmatched efficiency of JOY Axivane Fans are *real* advantages! What's more, their vaneaxial design and in-line construction permit mounting right in the air duct, making installation simple and saving greatly on time and cost. These features, plus the extreme flexibility of operating range made possible by adjustable blades—a standard feature of all JOY Fans—mean better, more dependable and lower-cost ventilation, no matter what your conditions are.

● Let JOY Axivane Fan specialists work with you for best results on your ventilation jobs.

*Reg. U. S. Pat. Off.

WAD 12355

JOY MANUFACTURING COMPANY

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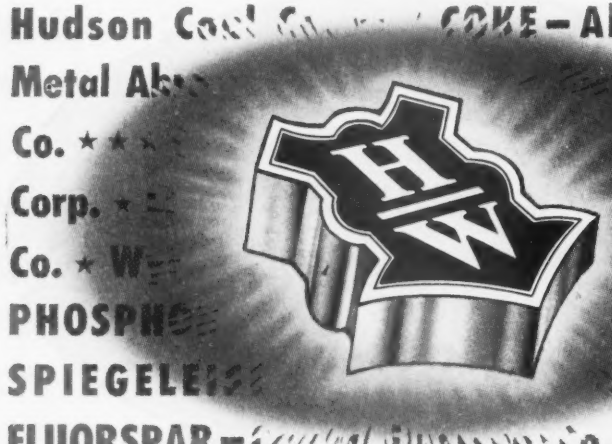
SHOT & GRIT – "T" AND PERMABRASIVE – National Metal Abrasive Co. ★ Western Metal Abrasives Co. ★ ★ ★ COAL – Harlan-Wallins Coal Corp. ★ Hudson Coal Co. ★ ★ ★ COKE – Algoma Steel Corp. ★ Citizens Gas & Coke Utility ★ Ford Motor Co. ★ Wyandotte Chemicals Corp. ★ ★ ★ FERRO-PHOSPHORUS – Victor Chemical Works ★ ★ ★ SPIEGELEISEN – New Jersey Zinc Co. ★ ★ ★ FLUORSPAR – Crystal Fluorspar Co. ★ Minerva Oil Co. ★ ★ ★ FLUXES – DOLOMITE AND LIMESTONE ★ ★ ★ Hudson Coal Co. ★ ★ ★ COKE – Algoma Steel Metal Abrasive Co. ★ Western Metal Abrasives Co. ★ ★ ★ COAL – Harlan-Wallins Coal Corp. ★ Hudson Coal Co. ★ ★ ★ COKE – Algoma Steel Corp. ★ Citizens Gas & Coke Utility ★ Ford Motor Co. ★ Wyandotte Chemicals Corp. ★ ★ ★ FERRO-PHOSPHORUS – Victor Chemical Works ★ ★ ★ SPIEGELEISEN – New Jersey Zinc Co. ★ ★ ★ FLUORSPAR – Crystal Fluorspar Co. ★ Minerva Oil PIG IRON – Algoma Steel Corp. ★ Carnegie-Illinois Steel Corp. ★ ★ ★ SILVERY PIG IRON – Jackson Iron & Steel Co. ★ ★ ★ SANDS, CLAYS, REFRACTORIES – Albany Sand & Supply Co. ★ Eastern Clay Products, Inc. ★ New Jersey Silica Sand Co. ★ Standard Sand Co. ★ Standard Silica Corp. ★ Valley Dolomite Corp. ★ ★ ★ CHAR-COAL – LUMP, BRIQUETS – Cliffs Dow Chemical Co. ★ Ford Motor Co. ★ ★ ★ MILL AND FORGING SCALE ★ CINDER ★ SAJCO JACKETS ★ ★ ★



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Established 1890

(*Concluded from page* 82)

We have long been interested in the great potential of resin-sand (shell) molding. We were, therefore, pleased to read the April editorial which also gave emphasis to nodular iron, since it appears certain that resin-sand molding will help to accelerate development of nodular iron.

Something over a year ago we advanced from the laboratory to the "pilot" plant stage. We have splendid facilities for pilot plant operation. In fact, our facilities are rather large for work of this character. Our experimental work should, therefore, be greatly expanded. For this reason, your September editorial is especially interesting.

If you know of captive foundry organizations who desire to embark on definite programs involving resin-sand molding processes, we should like very much to learn of them.

E. N. HARRISON
President

Econocast Inc.
1303 *Anderson Ave.*
Chattanooga, Tenn.

* * *

The Malleable Anniversary

TO THE EDITORS:

All of our members who have seen the October cover are tremendously pleased not only with the fact that you are using it as a cover, but also with the extraordinary beauty of the lay-out and design of the cover.

I think you know how much I appreciate your interest in recognizing our 125th anniversary through the medium of a specially designed cover.

LOWELL D. RYAN
Managing Director
Malleable Founders' Society
Union Commerce Building
Cleveland 14

●

TO THE EDITORS:

The cover on the October issue of FOUNDRY is one of the nicest I have seen on any trade journal in the last fifteen years. Your staff certainly deserves a lot of credit for the beautiful cover.

JESS TOTH
Secretary
Harry W. Dietert Co.
9330 *Roselawn Ave.*
Detroit 4

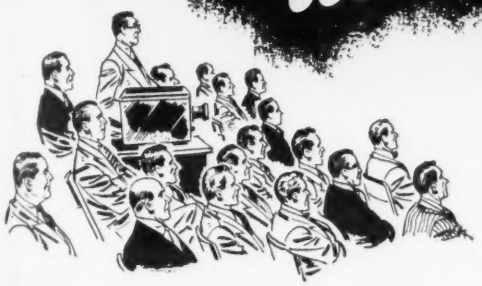
●

TO THE EDITORS:

The October issue has the most beautiful cover I've ever seen on your magazine.

C. C. FRACKER
Executive Assistant to the President
Hamilton Foundry & Machine Co.
1551 *Lincoln Ave.*
Hamilton, O.

Good News for EXECUTIVES who want to cut production costs!



MODEL 480-P, one of 5 new Towmotors featured in "What Makes It Tick?"

"WHAT MAKES IT TICK?" features 5 New Towmotors—and describes many important Towmotor advantages.

- ***AIR-COOLED CLUTCH**—largest in the industry.*
- ***POWERFUL HYDRAULIC BRAKES**—hold capacity loads on steep inclines.*
- ***DOUBLE UNIVERSAL JOINT**—protects engine against shocks.*
- ***HEAVY DUTY TRANSMISSION**—most efficient type of drive ever produced.*
- ***HOIST CYLINDER AND MAST**—provide highest "free lift" in the industry.*
- ***DOUBLE ACTING TILT JACKS**—speed lifting and stacking.*
- ***HYDRAULIC PUMP CONNECTED DIRECTLY TO DRIVE SHAFT**—eliminates power waste.*
- ***FULL FLOATING DRIVE AXLE**—transmits power without carrying truck load.*
- ***EXTRA HEAVY FRAME**—one piece; continuously welded seams.*
- ***HEAVY, INDUSTRIAL-TYPE ENGINES**—designed especially for Towmotor.*

Now you can see, in your own office, an informative 15-minute sound slide film entitled "WHAT MAKES IT TICK?" . . . showing Towmotor engineering features that cut handling costs in all phases of Receiving, Processing, Storage and Distribution.

When you see "WHAT MAKES IT TICK?" you'll see *why* Towmotor is faster and more agile; you'll see *why* Towmotor maintenance and operating costs remain low and give many extra *years* of trouble-free service; you'll see WHY Towmotor operates 'round the clock on heavy handling jobs . . . cutting production costs as much as 60%.

Plan now to see "WHAT MAKES IT TICK?". To schedule a showing in your office at your convenience, SEND COUPON TODAY! No obligation.

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COMPANY_____

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HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT ***AMERICANISM*** TODAY?

Stack Molding in a large production foundry. A common sprue, through the stack, feeds molten metal to runners leading to individual casting cavities.

STACK MOLDING with Sterling Steel Flasks Greatly Increases Production

It's really amazing how much you can increase your foundry casting output by employing Sterling stack molding flask sections. You'll find them especially ideal for long runs of small or shallow castings. Molds are made in flask sections stacked one above another, to a height of 10 or 12 sections. The increased amount of hot metal in relation to the total flask volume generates tremendous heat with corresponding increase in gas pressure. That's why Sterling Steel Flasks are ideal for this modern method of molding. Sterlings are constructed of special rolled steel channel with reinforcing rib to prevent distortion and misalignment of the stacked molds. The flasks retain their rigidity and accuracy under constant production pressure. It will pay you to investigate. Write today.

STERLING WHEELBARROW CO.
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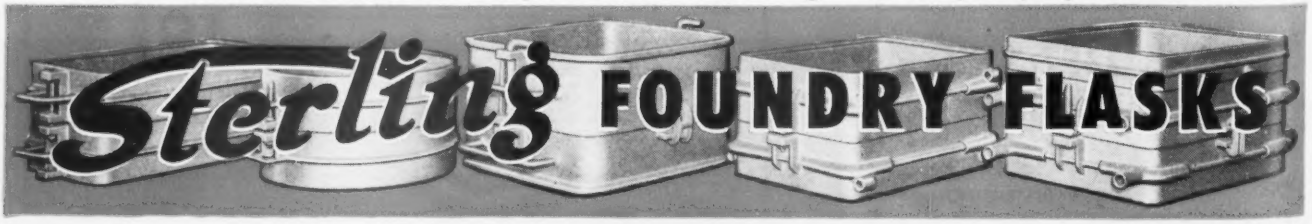

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They Don't Understand

POLICY-MAKING officials of the National Production Authority do not have a proper appreciation of the importance of castings in the mobilization program. The latest example of warped thinking on this subject developed at a recent meeting of the Foundry Equipment and Facing Manufacturers Industry Advisory committee when these NPA officials said "the very tight materials situation does not permit greater allotments of these materials to the manufacturers of equipment for the foundry industry." Realization of the essentiality of the foundry industry would indicate that unless equipment is produced in accordance with the needs of castings producers, the pressing demands for machine tools and the machines of war will not be met. Castings are basic materials in practically all production of the mobilization program, and allotment for foundry equipment certainly should be on the same percentage basis as for machine tools.

As one means of establishing some essentiality for government allotments of materials, manufacturers of foundry equipment and supplies in recent months have urged customers to pass along proper ratings when purchasing machines and materials. This appeared to be the logical method of placing first things first in the distribution of available supplies of materials, and especially metal products. Now some question as to the need for this procedure may have developed from a recent statement of Manly Fleischmann, administrator of NPA, to the effect that it is not necessary for manufacturers to urge customers to obtain a rating before placing an order. Whether the motives are political or otherwise, this statement certainly has been successful in increasing confusion.

Regardless of what top NPA brass is saying, the fact remains that ratings are playing an important part in the allotment of materials. A careful check of a number of men handling allotments under CMP confirms the fact that they are depending on extended ratings in determining the amount of materials to be allocated to industries and individual manufacturers, and it is probable such procedures will continue.

Therefore, if foundry equipment and supply manufacturers are to have some chance of obtaining allotments of those scarce materials, badly needed to build foundry equipment and supplies, foundrymen must continue to extend ratings on their purchases.

And if foundries are to render maximum service in the emergency, foundrymen and leaders of related industries must combine their efforts to make Washington officials realize that the mobilization program cannot succeed without castings in large quantities, and that castings cannot be made without foundry equipment and supplies.

Frank G. Steinebach
Editor

By EDWIN BREMER
Metallurgical Editor
FOUNDRY
and JULIAN B. McFARLAND
Publicity Manager
United States Pipe & Foundry Co.
Burlington, N. J.

Research IS Important

TO UNITED STATES PIPE & FOUNDRY CO.

RESEARCH and development are extremely important to the foundry industry since they result in the discovery of new facts, the revision of previously accepted conclusions, and an advance through evolvement of new manufacturing processes and products.

Early recognition of these attributes led United States Pipe & Foundry Co., Burlington, N. J., to establish a Research and Development department in 1928, and about a year later its members moved into a newly constructed laboratory. That building, three stories high with a full basement, was built as an east wing to the main general office building at Burlington. Containing complete chemical, physical testing and metallographic laboratories, it was considered one of the best equipped gray iron foundry laboratories. Early an outstanding accomplishment of the department was the improvement of the metal-mold centrifugal casting process to manufacture stronger and tougher cast iron pipe.

Fig. 1—These buildings house the Research and Development department of the company

While this laboratory, occupying about 10,000 square feet of floor space, was considered adequate for needs far into the future, the passing years indicated otherwise. As might be expected with a department and facilities available for conducting research and development, the number of projects for investigation began to increase rapidly. It also was found that study of one project required the conduct of parallel investigations to obtain more complete information. With the projects increasing in both number and scope, it is not surprising that facilities of the laboratory became taxed to the limit.

Therefore, in 1942 numerous pieces of physical testing equipment and machine tools were moved from the "research wing" to a nearby annex to make room for other laboratory activities. These moves sufficed to alleviate space requirements for a few years. However, development of new products using the basic centrifugal casting process requires extensive casting experimentation and the need for a large experimental foundry became apparent. Therefore, it was decided to combine all the laboratory facilities and an experimental foundry in one large building for the Research and Development department.

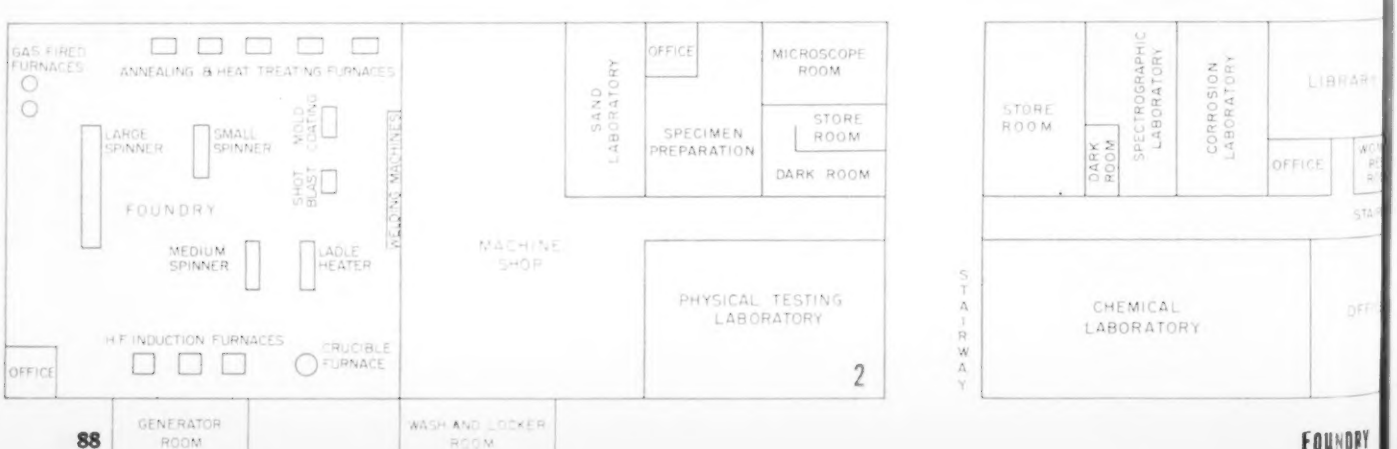


Fig. 2—Showing the ground floor plan of the laboratory and experimental foundry. Layout of the second floor is shown in Fig. 3

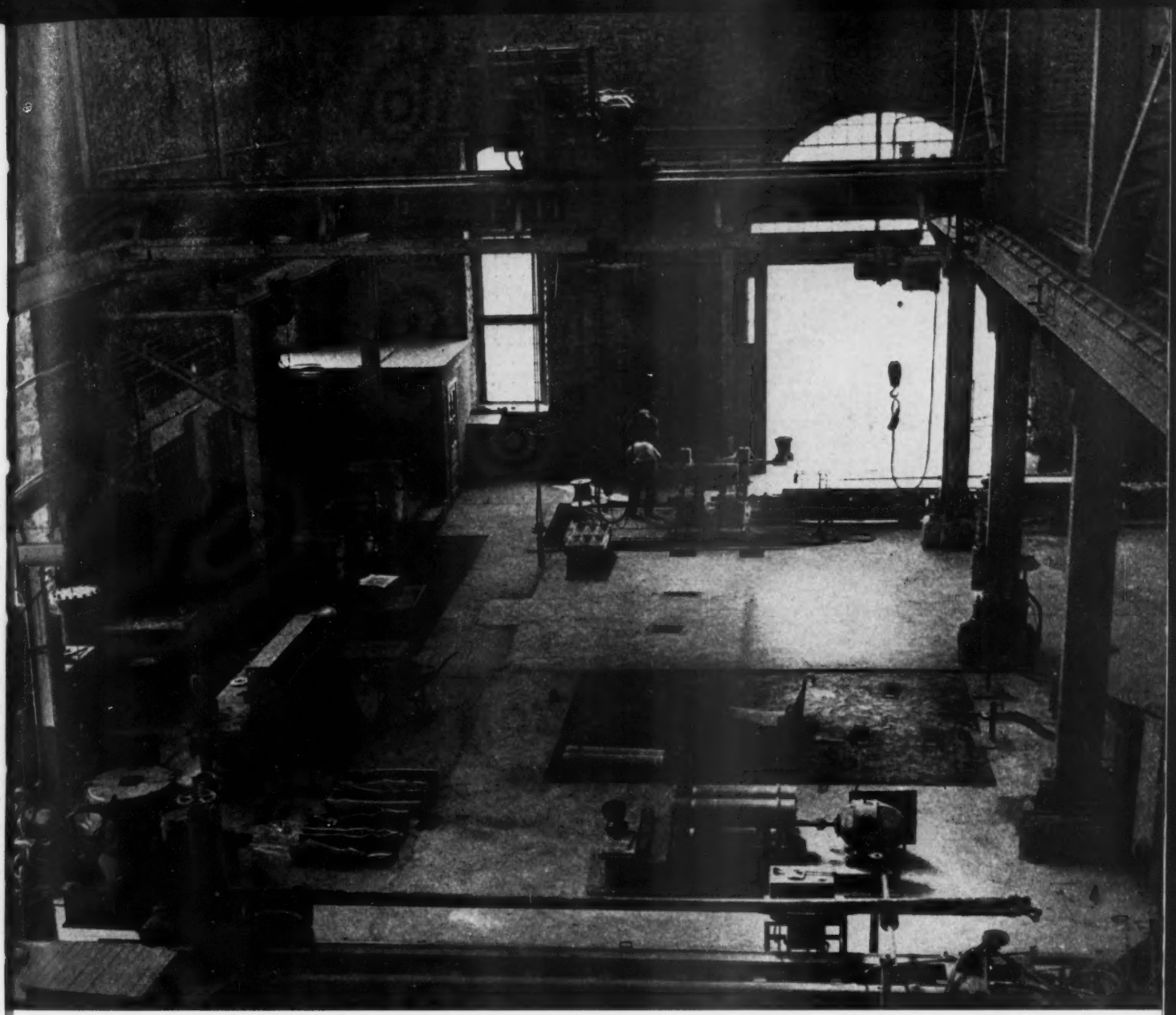


Fig. 4—View of east bay of experimental foundry

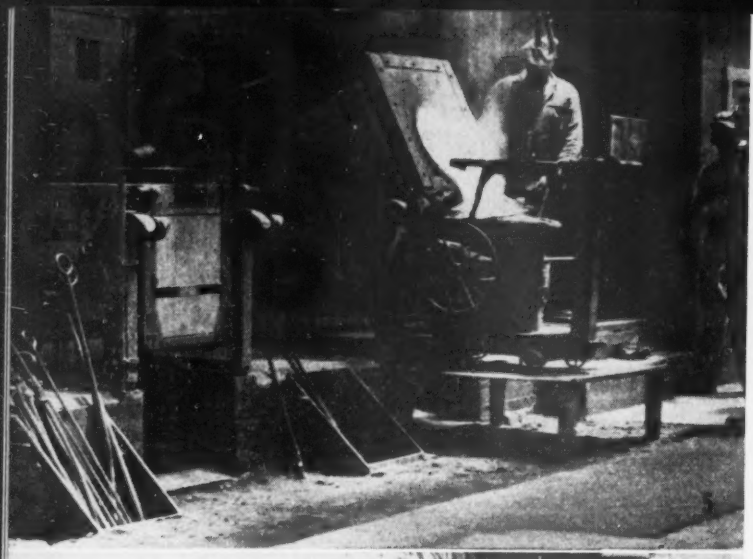
Selection of the new quarters for the department was a combination of economics mixed with sentiment, since two buildings were available which, with suitable structural changes, would serve adequately. One of the buildings, 70 x 190 feet, was that of No. 2 foundry in which thousands of tons of large diameter pit-cast pipe were made from 1876 until it was closed permanently in 1943. The walls of the building, made of durable brown stone 30 inches thick and about 35 feet high, have withstood the ravages of time well, and appear as though they will last forever. That building, with such changes as constructing a new roof, erecting a second floor in approximately one half of the building, piercing the walls for additional windows, etc., forms the quarters of the laboratories and experimental foundry. An adjacent one-story building of similar construction in which the pipe from No. 2 foundry was inspected, weighed and hydrostatically tested, was converted into an office for the Research and Development department.

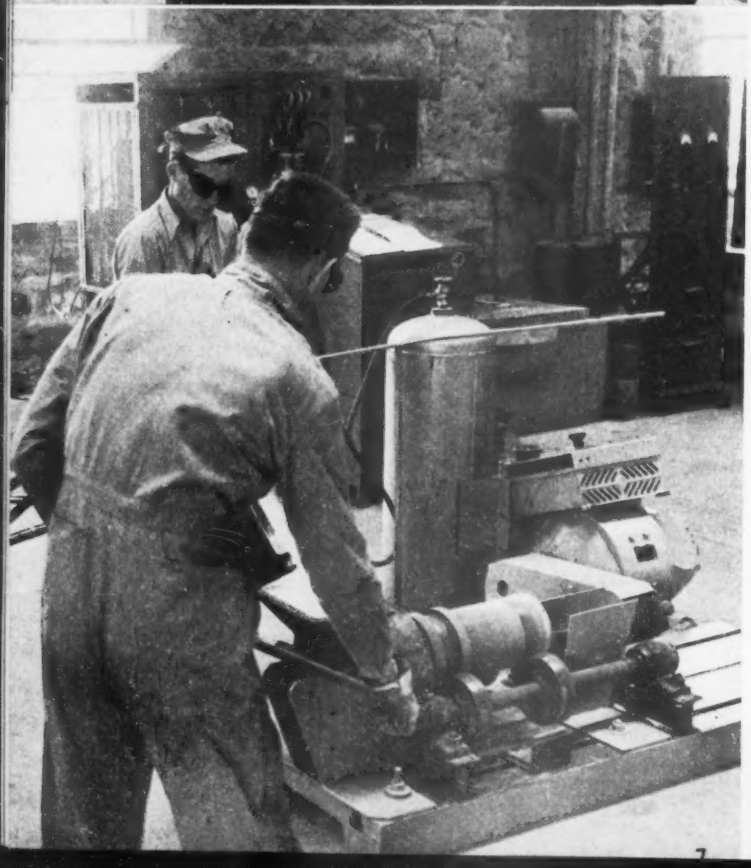
As shown in Fig. 1 this has resulted in two attractive buildings in which the heavy seasoned stone walls of the buildings have been blended nicely with the most modern type of construction and equipment. Research facilities of the new location are more than twice as large as the former quarters.

Fig. 2 is a sketch showing the plan of the laboratory and experimental foundry, indicating the approximate arrangement of some of the departmental sections and equipment, while Fig. 3 shows the layout of the second floor.

Organization of the Research and Development department can be divided into the following sections: Metallurgical, plant development, chemical engineering, physical laboratory, chemical laboratory, metallographic laboratory, and library. Metallurgical section is divided into two parts, one of which is devoted exclusively to cast iron and the other to steel and other metals. Each section is headed by an experienced metallurgist who, in turn, supervises projects in the experimental foundry.

The foundry, as shown in the accompanying illustrations, is equipped with the most modern facilities to carry on development work. Equipment includes one 500-lb, two 200-lb, and one 35-lb high-frequency induction melting furnaces, one 400-lb oil-fired cru-





cible furnace, two small crucible furnaces and one electrically heated resistance-type crucible furnace. For casting, three centrifugal type machines are available. One takes molds up to 30 in. in diameter and 12 ft long, another dual machine makes castings up to 8 in. in diameter and 4 ft long, while a small machine is available for castings up to 50 lb.

Additionally the foundry is equipped with several heat treating furnaces for annealing and heat treating purposes as well as temperature measuring instruments, welding equipment, shot blasting cabinet and mold coating equipment. Cranes and hoists are available for handling molds, ladles, etc.

Sand laboratory is well equipped to determine various properties of sand mixtures such as tensile and compressive strengths, permeability, grain size, etc., and includes such equipment as a dilatometer, a sintering-point instrument, sieving machines, automatically regulated drying oven, permeability apparatus, mixing equipment and a device for determining tensile and compressive strengths. A typical problem currently being handled relates to the improvement of the head or bell cores used in casting centrifugal pipes. The sand laboratory is part of the chemical engineering section which handles projects relating to pipe coatings, cement linings, corrosion and foundry sand.

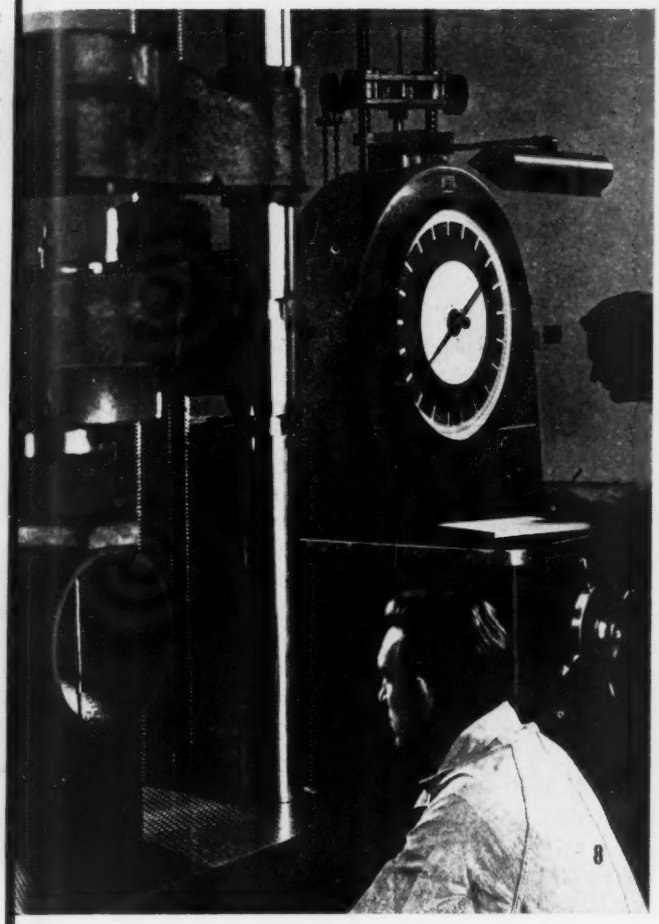
Physical laboratory is set up as a service laboratory to assist the development groups and the various plants of the United States Pipe & Foundry Co. Equipment includes a 200,000-lb universal testing machine, a 50,000-lb testing machine, a 120 ft-lb impact testing machine, brinell and Rockwell hardness testers and equipment for application of impact beam and bursting tests on full sized pipes. An important part of the physical testing laboratory is the well equipped machine shop which prepares test specimens, machines development products cast in the experimental foundry, and builds experimental equipment. Although each of the plants conducts routine tests of its own products, it also sends regularly to the physical laboratory duplicate Talbot strips cut from the pipe which are tested and serve as a check on the quality of product being produced.

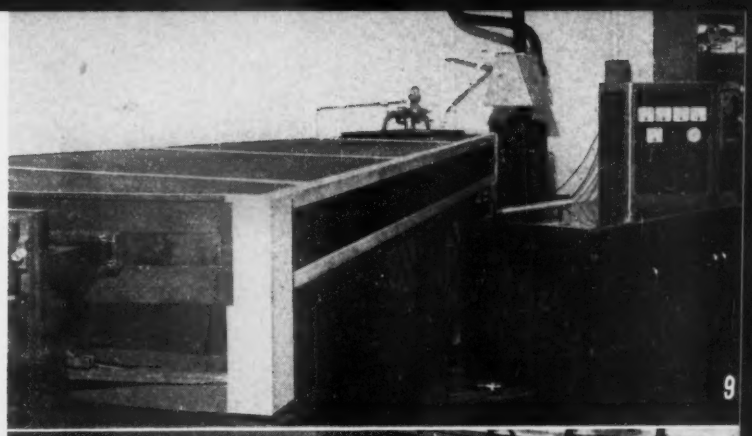
Chemical laboratory is equipped to make chemical analyses required by the development group. It also assists the various plants by performing special analytical work, and also establishes standard analytical procedures for the plant laboratories operated by the company. A large number of materials are analyzed since the firm's products include not only gray and alloy cast irons but steels of a wide variety, many of which have unusual and high alloy content; also other materials (metallic and nonmetallic) that are used or contemplated for use in manufacturing

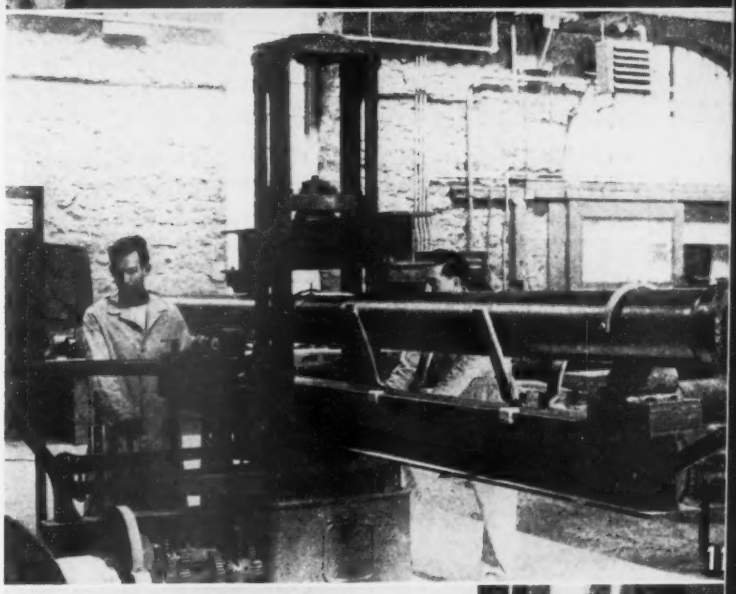
Fig. 5—Filling ladle from 500-lb induction furnace. One of two 200-lb furnaces at left

Fig. 6—Casting 4-ft lengths of 6-in. pipe in a medium-sized spinner at experimental foundry

Fig. 7—Pouring a pipe casting in a small spinner







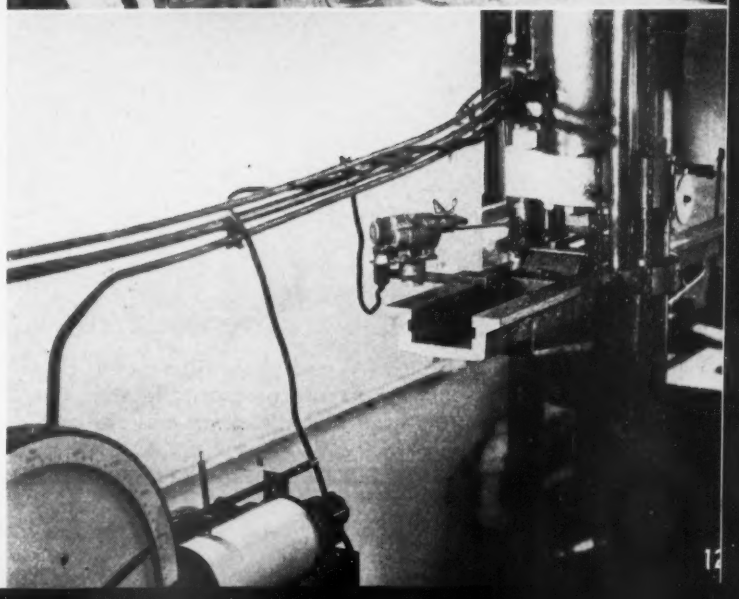


Fig. 8—Conducting ring crushing test on 12-in. pipe ring in a new 200,000-lb testing machine

Fig. 9—Spectrographic facilities to determine small quantity of elements in base materials

Fig. 10—Apparatus for volumetric determination of sulphur (at left) and carbon (at right)

Fig. 11—Making flexure test on 18-ft length of 8-in. pipe centrifugally cast in a metal mold

Fig. 12—Conducting Talbot strip test on strip cut from wall of centrifugally cast iron pipe

operations. Rapid methods of analysis are used for the elements normally determined in cast iron and steel samples. Some specialized equipment such as that used for volumetric determination of carbon and sulphur speed up results considerably. A recent addition to the analytical equipment is a large Jarrell-Ash spectrograph with microphotometer and calculating board and a well equipped dark room. All of these spectrographic facilities are located in an air-conditioned room so that all observations are conducted under controlled atmospheric conditions.

The metallographic laboratory primarily is concerned with the investigation of the structure of metals. Equipment includes a Leitz metallographic microscope producing enlargements up to 2000 diameters, and a Vickers projection microscope capable of obtaining magnification up to 4400 diameters. A microhardness tester also is (*Please turn to page* 198)

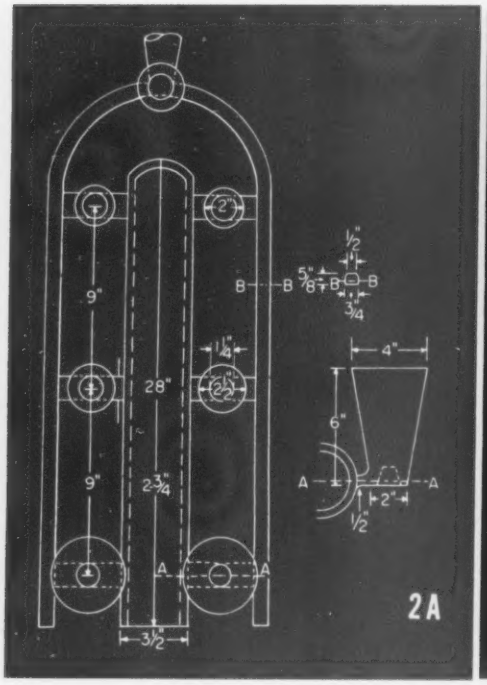
Fig. 1—Stair railing of cast and extruded solid nickel silver, Netherland Plaza Hotel, Cincinnati

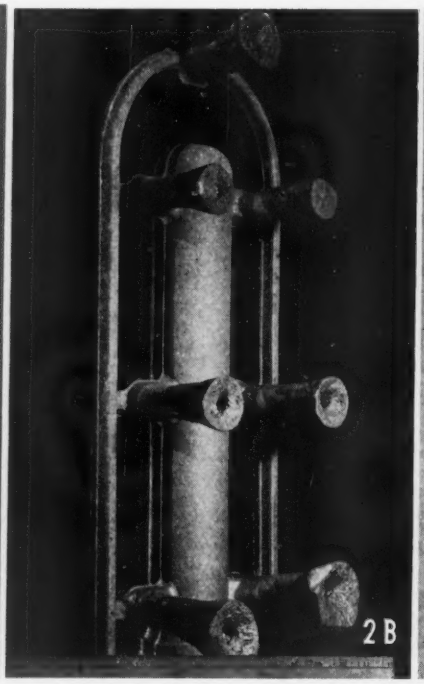
Nickel

SILVER has been one of mankind's favorite metallic possessions since the dawn of civilization. Early alchemists, striving to duplicate the quality of silver at less cost, succeeded in doing so by blending nickel-containing ores with copper-base metals or bronze. Over the centuries, nickel-silver alloys have served to embellish the art of living, with ornamental castings. Modern science has made the nickel-silver alloys available within the low cost bracket of brasses and bronzes. Advancement in the foundryman's art has enabled the engineer and architect to extend the inherent durability and beauty of the nickel-silver alloys to castings that are useful as well as ornamental. Statistical studies have provided specifications which define the product and assure a duplication of the desired quality.

Table I summarizes recent specifications. Table II lists some additional current casting compositions.

Nickel-silver castings are frequently used with wrought metal forms in the construction of machinery, hardware, architectural trim, etc. (Fig. 1). The wrought nickel-silvers are a family of brasses which contain 55 to 65 per cent copper, with nickel additions of 5, 10, 12, 15, 18, 20 and 30 per cent, while





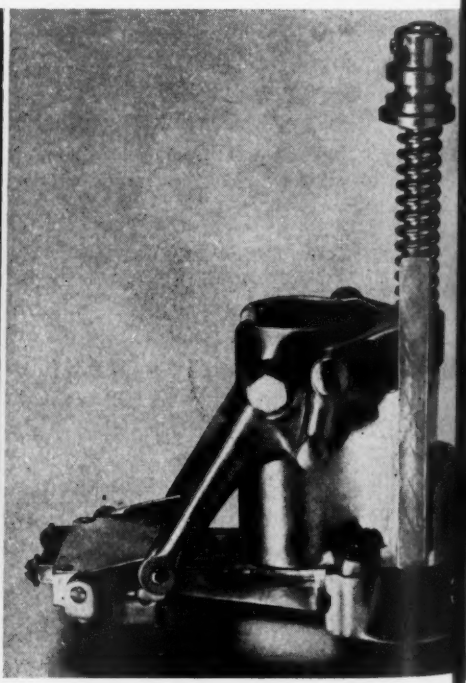


Fig. 2—Sketch (A) and photo (B) showing how riser volume increases progressively with distance from gate of nickel-silver pressure casting. (Courtesy Gibson & Kirk Co., Baltimore)

Fig. 3—Nickel-silver castings assembled into bottle-capping machine unit by the Cherry

By JAMES S. VANICK
Metallurgist
International Nickel Co. Inc.
New York

silver Castings

Nickel-silver alloys, combining durability with beauty, are the glamorous castings of the nonferrous foundry. The author describes their engineering properties, applications, and foundry practice in their production

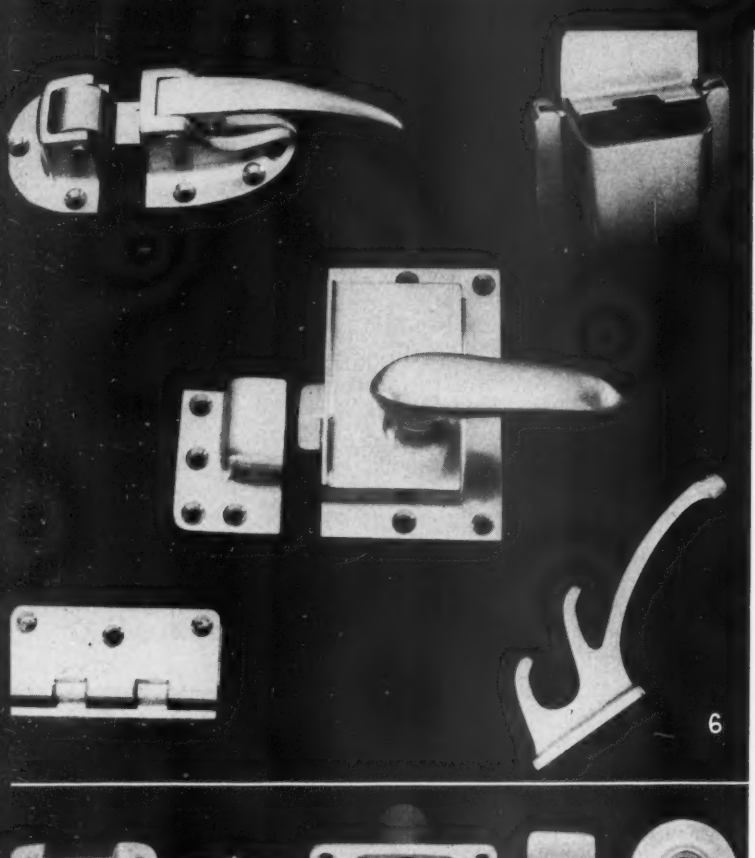
zinc comprises the remainder of the composition. These alloys, in the annealed condition, develop tensile strengths of 50,000 to 60,000 psi and approximate double these values in the hard-rolled condition. Cast nickel-silver alloys provide a good color match for equivalent nickel contents for practically all of the alloys mentioned above. Some of the special compositions within the 6 to 30 per cent nickel range will be mentioned later in the text.

The top grades of white metal castings in the nickel-silvers usually contain over 20 per cent of nickel and combine the ornamental lustre of this metal with utility in its ability to resist corrosion and damage from wear, abrasion or scuffing. From the foundryman's standpoint, the metal possesses the advantage of being much more readily cast than other white metals that compete with it for applications involving strength, appearance and durability. The nickel-silvers should be distinguished from the zinc-free copper-nickel alloys which are a stronger and more corrosion resistant group. The cupro-nickels will be described in a separate article.

Engineering Properties—Nickel-silver alloys can be strengthened by various methods; in general, they are selected for their appearance and resistance to tarnish and corrosion, which makes mechanical properties factors of secondary importance Tin, lead and zinc are important common constituents. Iron, silicon, sulphur, carbon and manganese are confined to tolerable amounts or eliminated completely for the good of the product.

Tin: The principal strengthening and hardening ingredient is tin. Tin generally is held to very low limits in the metallurgy of wrought nickel-silver alloys, but is admitted in the cast alloys for such benefits as it may confer. These might be summarized as a contribution toward strength, hardness and better casting quality. Tin lowers the melting point,

Burrell Co., Chicago. Fig. 4—Niag nickel-silver valve body used on chlorine gas cylinder to provide wear and corrosion resistance. Fig. 5—High-strength nickel-silver parts for dairy, valve and plumbing industries. (Courtesy Titan Metal Mfg. Co., Bellefonte, Pa.)



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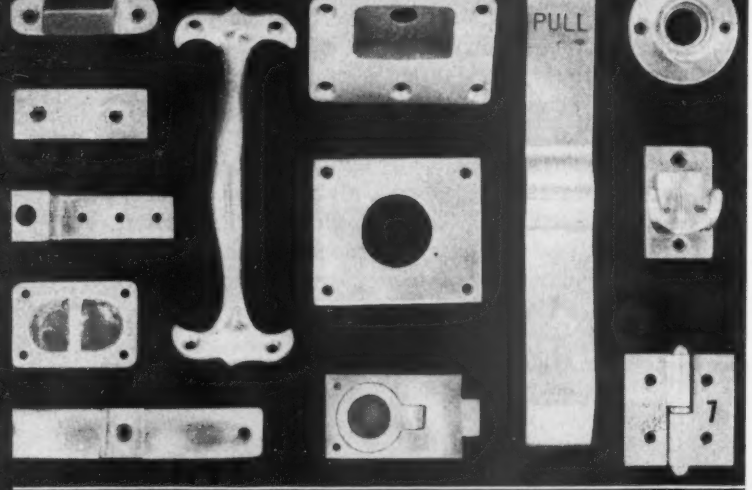

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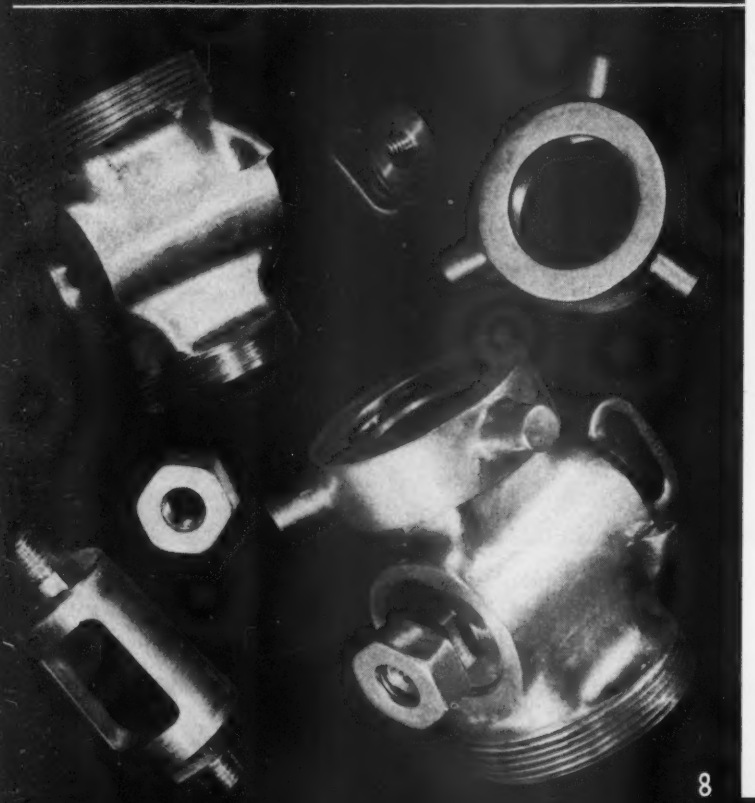

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and the fluidity of the material would be moderately improved. For example, a 20 per cent nickel-silver alloy hardens, as shown, for increasing tin contents:

Nickel Silver—20% Ni, 10% Zn, Bal. Cu			
Per cent tin	0	4	8
Brinell hardness	80	110	200

Lead: Lead is useful for its contribution to machinability and, in some cases, to bearing metal quality. It depreciates the strength and toughness, but may contribute toward providing pressure tightness in hydraulic castings or in castings subjected to fluid pressures. Excessive amounts of lead may create polishing problems because pock-marked areas or pits may develop from the concentration of lead into excessively large aggregates. In the presence of silicon, the harmful effects of lead are accentuated. The hardness decreases progressively, viz:

Nickel Silver—20% Ni, 10% Zn, Bal. Cu			
Per cent lead	0	5	10
Brinell hardness	90	70	65

Zinc: In the absence of lead, zinc additions up to 20 per cent contribute a strengthening effect. However, commercial casting alloys are rarely free of lead. In the leaded nickel-silvers, the strength is decreased as zinc contents increase (Table I and II).

Zinc lowers the melting point of the alloy. It also helps to purge the alloy of oxidizing gas during melting. These factors are helpful in the foundry. Large amounts of zinc may weaken the alloy excessively and concurrently introduce a slightly gray shade to the color if amounts in excess of 10 per cent are used.

It is interesting, in examining these alloys, that the addition of a white metal like zinc does not bleach the composition of its copper tone. This is evident in recognizing that a 60-40 yellow brass is unable to shed its copper color in the presence of as much as 40 per cent zinc. In contrast, the nickel addition progressively bleaches the copper color until, at 20 per cent nickel, a silvery shade is acquired, whether or not zinc is present.

Corrosion Resistance—A progressively increasing corrosion resistance is conferred by gradually increasing the nickel content until, at 20 per cent nickel, a high order of resistance to corrosion by sea water is achieved. Resistance to fresh water and to ordinary atmospheres is also good at the 20 per cent nickel content. Long-term exposures to outdoor marine and industrial atmospheres are likely to produce a tarnish.

Cleaning, Polishing, Plating, Coloring—Nickel-silvers may be cleaned, if necessary, by acid pickling or electrolytic dipping. They may be polished with the aid of suitable abrasives and buffs. They may be silver plated or coated with other desirable metals. In

Fig. 6—Nickel-silver hardware for railroad car fixtures. (Courtesy Loeffelholz Co., Milwaukee)

Fig. 7—Hardware used on passenger cars for appearance and corrosion-resistance features. Cast in nickel silver by Robert Mitchell Co., Ltd., Montreal

Fig. 8—Parts and assembled view (lower right) of nickel-silver valve used with a meat packing machine (Courtesy Lakeside Bronze Inc., Buffalo)

a few cases, they may be deliberately blackened or surface-tinted into the green and related patinas for ornamental effects. As already mentioned, a range of color contrasts can be obtained by varying the nickel content. For most purposes, the distinctive white color of the 20 per cent nickel product seems to be desired.

Production—Over the years, the less rigorous purposes to which the nickel-silver castings have been put, and their greater appeal to beauty, led to a dilution of their composition, so that larger amounts of lead, zinc and tin were included in their make-up. A lower cost was achieved by adding appreciable quantities of secondary bronze ingot to the copper-nickel base. These additions lowered the strength and corrosion resistance, but they also made it possible to produce the solid silvery-colored alloy at low cost.

Nickel-silver alloys may be commercially produced by combining Ounce metal, or 85-5-5-5 material, with 20 per cent of nickel, thus reducing the lead, tin and zinc to approximately 4 per cent of each. The 11-A grade in Table I is an alloy of this type. This alloy is widely used for plumbing goods, valves, fitings, marine castings, hardware, (*Please turn to page* 254)

Fig. 9—Pump made of nickel-silver castings used for handling chemical products and beverages. (Courtesy Waukesha Foundry Co., Waukesha, Wis.)

TABLE I—Typical Commercial Nickel-Silver Compositions[a]

	10A[b]		10B		11A[b]		11B[b]	
	Min	Max	Min	Max	Min	Max	Min	Max
Copper, per cent	53.0	58.0	58.0	61.0	63.0	67.0	64.0	67.0
Tin, per cent	1.5	3.0	2.5	3.5	3.5	4.5	4.0	5.5
Lead, per cent	8.0	11.0	4.5	5.5	3.0	5.0	1.0	2.5
Zinc, per cent	Remainder		Remainder		Remainder		Remainder	
Nickel, per cent	11.0	14.0	15.5	17.0	19.5	21.5	24.0	27.0
Iron, per cent	...	1.5	...	1.0	...	1.5	...	1.5
Manganese, per cent	...	0.5	...	0.5	...	1.0	...	1.0
Impurity Limits:								
Sulphur ..... .05 per cent, max								
Antimony ..... .25 per cent, max								
Tensile strength, psi, min.	30,000	...	35,000	...	30,000	...	45,000	...
Elongation in 2", min., per cent	8	...	17	...	8	...	15	...
Pouring temperature, °F, (light castings)	2,250	...	2,350	...	2,450	...	....	...
(medium castings)	2,200	...	2,250	...	2,300	...	2,550	...
(heavy castings)	2,050	...	2,150	...	2,200	...	2,350	...

(a) From "Recommended Practices for the Sand Casting of Non-Ferrous Alloys", AFS, 1944, p. 51
(b) ASTM Specification B149-49

TABLE II—Nickel-Silver Compositions for Various Applications

Application and Descriptive Title	Chemical Composition						Tensile Strength	Yield Point	Elongation %	Brinell Hardness (1)
	Nickel	Copper	Tin	Lead	Zinc	Phos.				
1. Plumbing fixtures (2)	20.00	65.00	4.00	5.00	6.00	0.05 max	45,000	27,000	15	95
2. Builders' hardware (3)	20.00	60.00	none	none	20.00	0.05 max	45,000	20,000	35	55
3. Architectural trim—Faint yellow color (4).	13.00	55.00	2.00	10.00	20.00	0.05 max	40,000	25,000	15	100
Metallic white color (5)	15.00	55.00	4.00	8.00	18.00	0.05 max	40,000	25,000	15	100
4. High hardness (free cutting)	20.00	56.00	4.00	1.00	15.00	0.05 max	55,000	40,000	10	140

(1) Brinell hardness obtained with 10 mm ball at 1000 kg load. (2) This alloy conforms to Federal Specification WWP-541 for nickel silver, and to Federal Specifications FF-H-106, FF-H-111 and FF-H-116 for builders' hardware. (3) Composition 1 is also employed for this application. (4) The color of this alloy matches that of extruded 10% nickel silver. (5) The color of this alloy matches that of extruded 13% nickel silver.

TABLE III—Nickel-Silver Alloys*

Alloy	Cu	Ni	Zn	Sn	Pb	Max Fe	Max Mn	Max Al	Tensile Strength Psi	Yield Point Psi	Elongation %	Bhn	Rockwell B
A—22% Ni	52-56	21-23	Bal	3.5	1.0	1.0	.75	1.0	50,000	47,000	3.0	150-185	80-90
B—15% Ni	44.48	12-15	Bal	1.0-1.5	.5-1.0	1.0	.50	1.0	50,000	47,000	4.0	150-185	80-90

* Produced by Universal Castings Co., Chicago

TABLE IV—Die-Formed Nickel Silvers*

Material	Ni	Cu	Zn	Pb	Fe	Mn	Tensile Strength Psi	Yield Point Psi	Rockwell B
Ti-nic-o-sil #14—15-18% Ni	15	42.5	Bal	..	..	..	105,000	70,000	95
Ni-nic-o-sil #21—10% Ni	10	50.0	Bal	1	1	3	.....	.....	75
Ti-nic-o-sil #53—10% Ni	10	46.0	Bal	..	..	..	102,000	75,000	90

* Produced by Titan Metal Mfg. Co., Bellefonte, Pa.

By E. M. HUNT
Production and Quality Control Engineer
R. B. Carolin Foundry & Machine Co.
Detroit

Producing Leak-Proo

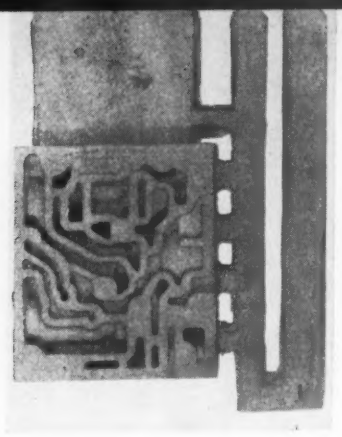


Fig. 1 — Dry sand mold is poured in a vertical position

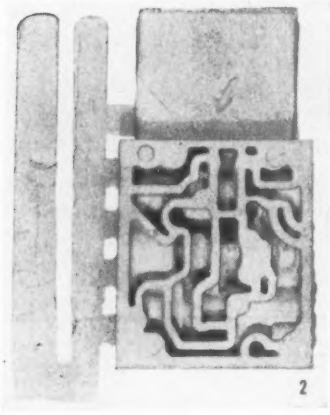


Fig. 2—Metal enters the mold through several step gates. The top gate enters the riser

TODAY, the foundry industry is called upon by government procurement branches through prime and subcontractors to produce castings of such intricate design and high quality, and to meet such rigid specifications, that only the most progressive thinking and laboratory controlled foundries can expect to compete. Quality control methods in the foundry are just as exacting and precise as those required in precision tool and die shops.

Any discussion of aluminum casting techniques should include a break-down of various causes of gas or porosity problems uncovered by x-ray, and their remedies. Castings which contain micro or pinhole porosity resulting in leakers, usually can be traced to poor furnace control or lax operations. It is most important that the furnace top be well sealed so that air or flame does not come into contact with the molten bath. It is common practice in some shops to preheat ingots or risers on top of the furnace. If metal does come in contact with the open flame, a certain amount of vapor from the air or combustion products will be picked up and absorbed by the molten metal. It is recommended that an industrial engineer from the local fuel supply source check fuel mixture for good combustion. With the proper instruments he will adjust the furnace burners to provide perfect combustion.

Compressor aftercoolers should be drained daily, and traps installed on air lines to remove water and to prevent moisture from reaching the furnace. Vapor and moisture from air and fuel supply readily break down at high temperatures to form oxygen and hydrogen. Although oxygen has no bad or damaging effect on aluminum, hydrogen is the most potential enemy and cause of porosity. Crucibles should be painted daily with a good ladle wash and completely cleaned and repainted at the end of shift operations.

Ingots and risers should be abrasive blasted before melting, and it is advisable to save all sprues, runners and gates for a separate melt. In sawing or removing gates and risers, a film of grease is picked up from grease sticks or compounds used in sawing and grinding operations. Abrasive blasting will remove this film. Since one purpose of a sprue is to trap air and drosses before metal enters mold cavity, it is evident that a risk is taken in using such contaminated metal in the crucible. It is best to remelt such metal and pour into pigs or ingot and make a complete physical and chemical check before using.

Through constant checking over a period of years it has been found that dry fluxing is preferably carried on between 1280 and 1300° F. Many proprietary fluxes when properly used will remove the majority of the drosses. If graphite fluxing cups cannot be obtained, a good job can be done with a cast iron cup, should be plunged to the bottom of the crucible coated with a wash. The flux in a preheated fluxing cup, shoud be plunged to the bottom of the crucible and held there until all physical and chemical reaction has stopped. When skimming, care should be used to avoid agitation of metal during the operation.

Degassing is the most important step before pouring the metal. The two recognized and well known degassing agents are dry nitrogen and chlorine gas. Method to be used will depend largely on the individual. Dry nitrogen is harmless as far as the safety factor is concerned. Chlorine gas is deadly toxic. While it gives a chemical as well as a physical reaction in the melt, chlorine is most difficult to handle because of its high corrosive action and, of course, the safety factor involved in handling.

The dry nitrogen tank should be equipped with sensitive control valve. This is standard equipment stocked by most welding supply houses. A light flow of gas is needed and the standard tank valve will not give the sensitive control. From the tank connect approximately 10 ft of neoprene rubber hose. To this connect 4 ft of ½-in. black iron pipe. Two types of

Aluminum castings which must be pressure-tight require careful control in their production. The author offers various recommendations for minimizing porosity in such castings

Aluminum Castings

graphite degassing or fluxing tubes are available on the market. One has a closed end with a series of fine holes drilled radially for a distance of 2 in. above the closed end. The other is threaded at the lower end to take a diffuser cap or head. The latter is porous graphite which permits the nitrogen ejection in the form of extremely fine bubbles. Graphite tubes are threaded on the opposite end for an iron elbow fitting which in turn is reduced to permit attachment of the ½-in. iron pipe. Nitrogen should be used when the metal temperature is about 1250 to 1300° F and about 3 cu ft of nitrogen is used to each 100 lb of aluminum.

It is not necessary to have a ventilation hood or fan over the furnace when using nitrogen. The nitrogen should be turned on before submerging the degassing tube in the metal. Otherwise, molten aluminum will clog the small holes in the diffuser cap. Just enough nitrogen pressure should be used to give a gentle, rolling motion and care should be taken to keep the oxide on surface of melt from breaking. This would be dangerous as far as hydrogen pickup is concerned. The correct period or time to degas is just before pouring. Constant practice and check of the tank pressure gage, soon will show just how long it will take for the degassing period.

If chlorine is to be used, a good ventilation system is necessary. Also, the tank valves must be stainless steel. The hose must be neoprene, and the pipe leading from hose to graphite tube will have to be replaced frequently due to the intense corrosive action of chlorine. A three-minute degassing period to each 100 lb of aluminum is recommended. As the chemical reaction of chlorine removes a certain portion of the magnesium content of aluminum-magnesium alloys, additions of magnesium should be made just after degassing and before pouring. Small magnesium bars can be cut into short lengths and used to provide the correct magnesium content. Addition of magnesium to the melt is very slight, but is necessary to meet specifications. After making a few physical checks, one will soon be able to judge the approximate amount of magnesium to add.

Chlorine gas has a tendency to enlarge the grain structure through chemical action and in some cases it may be necessary to use an addition of grain refiner. This is entirely up to the engineer or foundry personnel who are acquainted with uses of the castings and whether an enlarged grain condition will affect its application. Another cause of grain enlargement is overheating the metal. A pyrometer should be used at all times and checked for accuracy at least twice a day. We suggest use of chrome-alumel leads in the pyrometer. A loose connection in the pyrometer, or a weak dry-cell battery in a potentiometer can cause a lag of 10° to 15° F.

The main purpose of the sprue and pouring basin is to avoid entrapment of air as the metal enters the mold cavity through the gating and runner system. Since it is practically impossible to ream a sprue or pouring basin the same size each time a mold is made, it is most desirable that a pouring cup be used at all times. This will eliminate all guess work and give a good choked condition when pouring. Thin oblong sprues should not be reamed, but left as is. The pouring cup will serve as the head or basin.

The modern foundry will have an x-ray control record of a job before starting production. Many aircraft companies and their (*Please turn to page* 218)

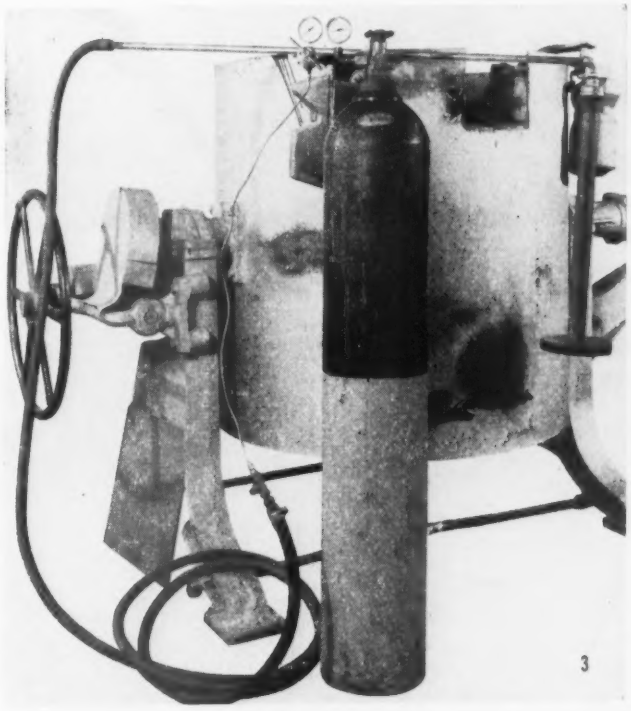


Fig. 3—Metal in furnace is degassed either by dry nitrogen or chlorine gas, approximately 3 cu ft per 100 lb metal

A pilot foundry can prove highly useful in producing sample castings, developing gating and risering practice, establishing the correct method for producing short-run jobs, and providing experience for new trainees. How the Lynchburg Foundry Co. operates its pilot foundry is described in this article, which is reproduced from the company's publication, The Iron Worker

By CARL B. STONE
Assistant Foundry Superintendent
Lynchburg Foundry Co., Lynchburg, Va.

DEVELOPING A *Pilot Foundry*

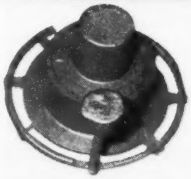
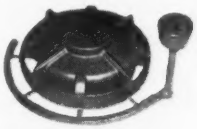
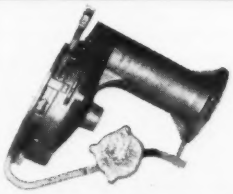
IN OUR Lynchburg foundry we accept many jobs for numerous customers. Only a small number of castings are required from a large percentage of these patterns. On a short-run job, it is imperative at the beginning to establish the correct method for making the casting. Otherwise, after the run has been completed it may be discovered that the scrap is too high. If the job doesn't run again for two or three months it may be hard to remember what happened that last time. The management decided to write up job methods, in such a way that they could be of some real help and make them available to all shop personnel.

We realized that a lot of work was necessary on gating and risering. Patterns are received from dozens of customers, and in most cases the gating on these patterns is entirely different from ours. All have served very well in other shops where the core-making, molding, cupola practice and sand are different. But they don't always do so well for us.

When a customer sends a new pattern he generally

(Above) — Checking pouring time and temperature in the Lynchburg pilot foundry

(Right) — Spraying cope pattern, at the left, while squeeze head is being lined up on drag machine

		Casting Weight	Sprue Area	Choke Area	Pouring Time	% Yield Before	% Yield After	% Scrap Before	% Scrap After
	Job 1	102	.601	.468	22	63.8	66.2	19.0	5.9
	Job 2	55	.601	.313	15	74.0	82.0	9.1	3.8
	Job 3	77.5	.601	.375	24	New Job	82.0	New Job	5.4
	Job 4	133	.601	.500	25	New Job	92.0	New Job	1.6

Showing yield and scrap on four castings before and after changes were made in gating arrangement

requires us to provide him a sample casting, which he must approve before we can go into production. This always involved disruption of the entire production cycle. We had to shut down a production loop and change patterns and flasks to make two or three castings.

Each year we have college graduate trainees come through our shop. We want to give them the very best training possible—not just the fundamentals of foundry practice, but also many of the technical and practical details.

These reasons led to the establishment of a pilot foundry with two jolt squeeze, strip, pin lift molding machines similar to those on our mechanical loops. We put up an overhead crane to handle flasks, made special hoppers to haul sand and tried to simulate conditions on the loops as nearly as possible.

Work on gating and risering was one of the first projects. We analyzed scrap reports and picked out the best jobs in the shop, jobs which always showed a low scrap loss. These jobs, plotted on graph paper, showed a fairly smooth curve. By striking an average through these points, the following formula was developed:

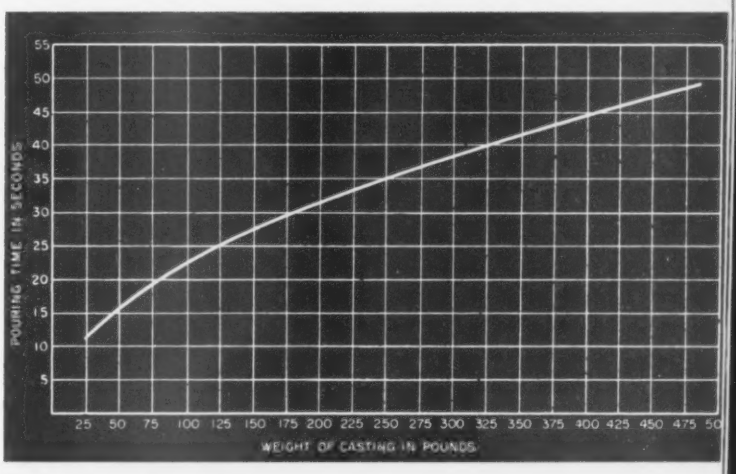
$2.2\sqrt{W}$ = pouring time in seconds
W = weight of the casting in pounds

By using the curve shown in the accompanying illustration it is possible to take the weight of the casting in pounds and find the proper pouring time in seconds.

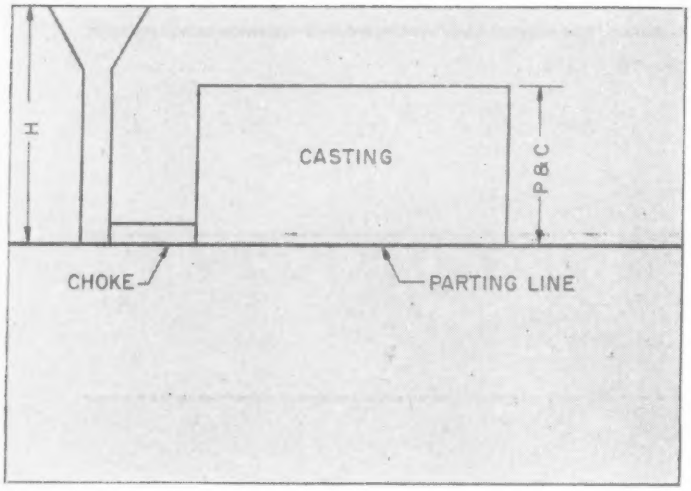
At some later date we may have to make an additional curve, or curves, for different classes of castings, but the work done to date has produced excellent results.

At the time we were analyzing our best jobs for pouring time, we found that they had one important feature in common. The choke or smallest area in the gating system was in the sprue. This seemed to be in opposition to good foundry practice but nevertheless it was a fact.

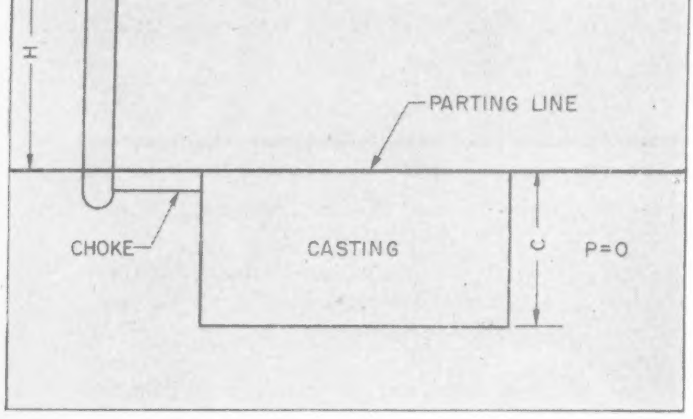
The next step was to take some jobs that ran fairly



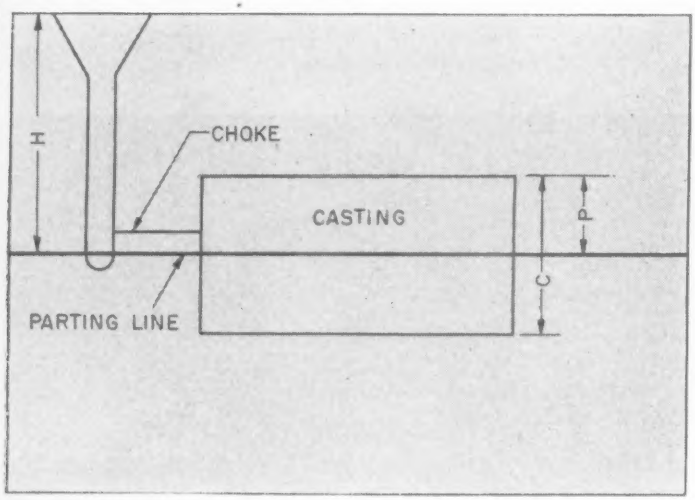
Graph showing the relationship between the weight of a casting and the time required to pour it



Showing the value of *H, P* and C when the casting is made entirely in the cope



Showing the value of *H, P* and C when the casting is made entirely in the drag



Showing the value of *H, P* and C when the casting is made in both cope and drag

well, but where the pouring time wasn't quite on the curve. In every case where the pouring time was changed to the curve the scrap loss was lower.

On some of the jobs that were not running satisfactorily we put a choke into the runner, as shown in Job 1 in the accompanying table. A 20 per cent foundry loss on this clutch drum casting for a large tractor was reduced to about a 5 per cent loss. This is considered satisfactory because the casting must pass a very rigid inspection. The motor end frame shown in Job 2, running at a 10 per cent loss, was reduced to a 3 per cent loss.

Jobs 3 and 4—a tractor transmission drive housing and a truck brake drum, respectively—are new jobs. They are gated on the curve with a choke into the runner at the bottom of the sprue, and are running at a very low loss. The per cent yield and other information about these jobs are shown in an accompanying table.

By the use of this gating system we have also been able to eliminate the use of facing sand almost entirely.

To determine in advance the size of choke required to pour a casting in the time shown on the curve, two formulas are required:

$$\text{Effective sprue height} = 2HC - P^2/2C$$

H = Height of sprue above choke
C = Height of casting
P = Height of casting above choke

After determining the effective sprue height, the following formula will give the size choke required in square inches:

$$\text{Area of choke} = 0.13\sqrt{W}/\sqrt{EHS}$$

W = Weight of casting in pounds
EHS = Effective sprue height in inches

In the formula for determining the area of choke, the 0.13 factor was determined by actual practice in the shop. For example, a given casting with an EHS of 14.2 inches was supposed to pour in 37 seconds. It required a choke area of 0.601 square inches to accomplish this. So by letting X equal the unknown factor and working backwards, the result was:

$$0.601 = X\sqrt{W}/\sqrt{EHS}$$
$$17X = 0.601 \times 3.7$$
$$X = 0.13$$

Probably these factors would not work in some other foundry where the fluidity of the iron is different. Therefore, the melting and pouring practice would have to be taken into consideration, and the fluidity factor adjusted.

Results of this work have been very gratifying so far. We haven't always been right. We have found that the shape of the choke is important. When the choke is too thin the increased resistance to the iron flowing through changes the pouring time and also washes some sand loose. Up to the present we are not positive, but we believe that the choke must be from three to four times as wide as it is high. No doubt, we will run into other "snags" as we go along.

International Foundry Congress

Attracts 200 Delegates from 16 Countries

By VINCENT DELPORT
European Manager
FOUNDRY

BRUSSELS, capital of Belgium, was the setting of the 1951 International Foundry Congress, sponsored by the International Committee of Foundry Technical Associations. The Belgian Foundry Technical Association was host and organizer. Belgium, with a population of some 8½ million, is strongly industrialized, and some interesting works were open for inspection at Liege, Seraing and Charleroi.

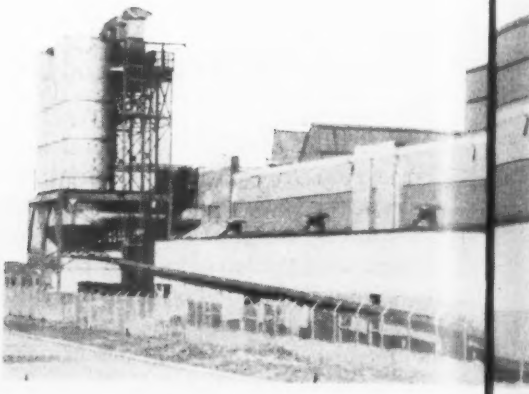
The international aspect of the congress, held Sept. 10-14, was strongly marked, some 200 delegates from 16 countries being present. The American delegation comprised a dozen members, headed by Walter L. Seelbach, president of the AFS. It was the first time in the history of international foundry congresses held in Continental Europe that so many American foundrymen were present, and the second time that a president of the American society attended in person. Meetings of the International Committee of Foundry Technical Associations and of its subcommittees on Cast Iron (*Please turn to page* 186)

MARCEL BORGERHOFF
President
Belgian Foundry
Technical Association

F. W. SPIES
President
Internation Committee
of Foundry Technical
Associations

Members of International Committee of Foundry Technical Associations. First row, left to right: W. L. Seelbach, AFS president; Mario Olivio, Italy; Tom Makemson, honorary secretary, Great Britain; J. H. Kuster, Germany; Guido Vanzetti, Italy; F. W. Spies, president, Netherlands; V. C. Faulkner, Great Britain; Marcel Borgerhoff, Belgium. Second row: Dr. P. W. Muller, Switzerland; J. Sissener, Norway; C. Gresty, Great Britain; E. O. Lissell, Sweden; J. Drachmann, Sweden; R. Reitsema, Netherlands; Dr. E. Hugo, Germany; J. Foulon, Belgium. Third row: A. Brizon, France; Vincent Delport, United States; M. Vuilleumier, Switzerland; J. Goffart, Belgium; Hohh Ove, Denmark

How castings are handled after they leave the shakeouts is described in this fourth and concluding article detailing the modernization program carried out by the Studebaker Corp. in doubling the capacity of its gray iron foundry



STUDEBAKER Doubles Foundry

TWO trolley chain conveyor cooling lines at the Studebaker Corp.'s modernized foundry are routed past the casting shakeouts and pass out of the foundry building. They then enter an enclosed, double-deck, cooling shed where dust and smoke are exhausted by roof fans.

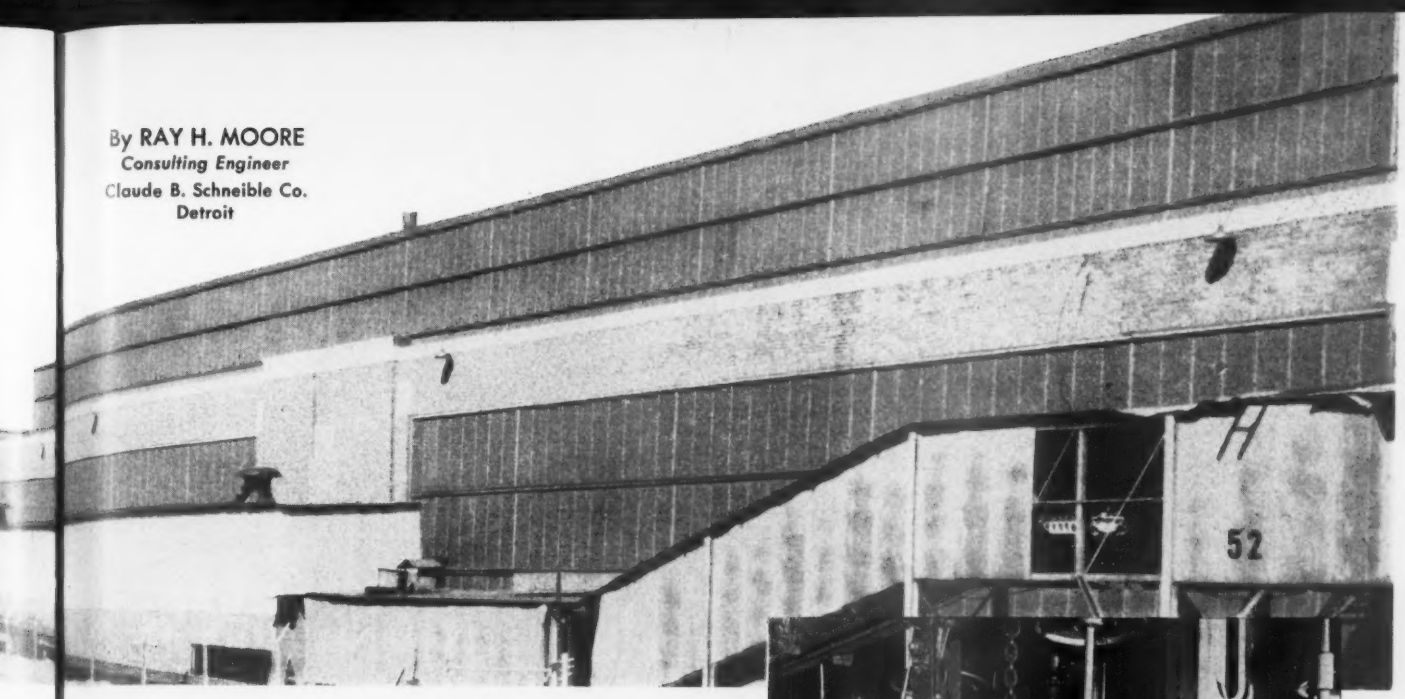
One cooling conveyor, handling cylinder block castings, provides approximately four hours of cooling time, while the other conveyor, handling the lighter castings, is of sufficient length for about two and one-half hours of cooling time.

The lighter casting cooling line, carrying clutch housings on multiple hooks and heads and other castings in baskets, emerges from the cooling shed and travels directly to the cleaning room and through a basket dumping station. The baskets are suspended from the conveyor trolleys by bails on trunnions and are held upright by a latch on the basket shell which straddles the bail bar.

When the basket enters the dumping station it is unlatched manually and rolled over, dumping its castings onto a chute. The chute is horizontal when receiving castings and just low enough from the basket to clear a load, thereby limiting the distance of the drop to a minimum. After the chute receives a basket load of castings one end is lowered pneumatically to permit the castings to slide onto a sorting belt. The castings can slide onto the belt only as fast as the belt takes them away from the end of the chute. By this means the castings feed onto the belt in a single layer for easy sorting.

Flywheels, bearing caps and other castings to be tumbled or cleaned in centrifugal blast barrels are sorted into tote boxes, which are transported by fork lift trucks to the mill room. Cylinder heads are sorted from the belt and placed on the fixtures which carry them through a four-wheel centrifugal blast cabinet. These fixtures are carried on a power and free trolley chain conveyor. In that portion of the conveyor extending along the sorting belt the trolleys run free on the overhead rail. The trolleys carrying the fixtures are drag-chain propelled into this free-running section where they accumulate until the fix-

By RAY H. MOORE
Consulting Engineer
Claude B. Schneible Co.
Detroit



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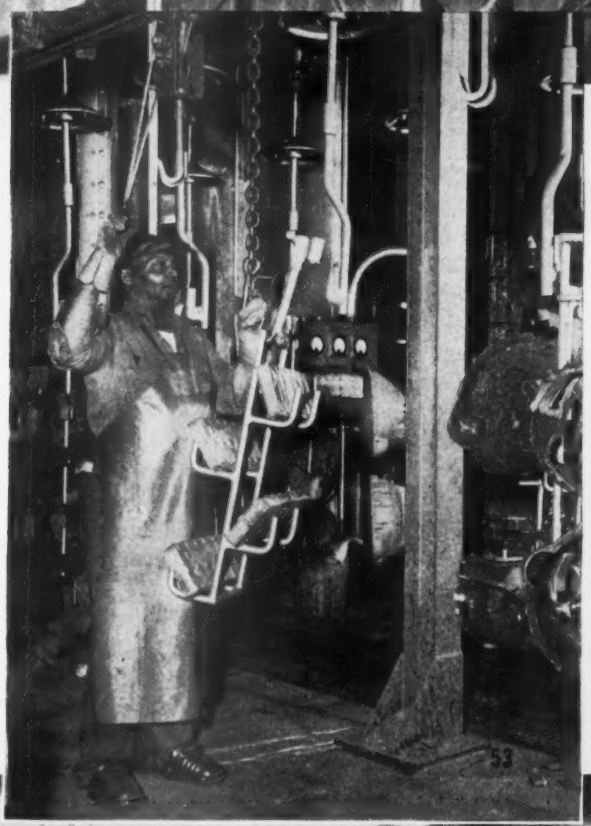


Fig. 52—Trolley chain conveyor cooling lines pass through an enclosed, double-deck cooling shed. A 600-ft gravity sluice conveys effluent water from four multiple-stage wet dust collectors

Fig. 53—Conical hook points engage tapered sockets for rigid suspension of casting holding fixtures from the blast cabinet spinner hook conveyor

Fig. 54—A sorting belt moves castings away from dump chute in a single layer for easy sorting

Fig. 55—Cylinder heads pass through progressively arranged finishing operations on roller conveyor

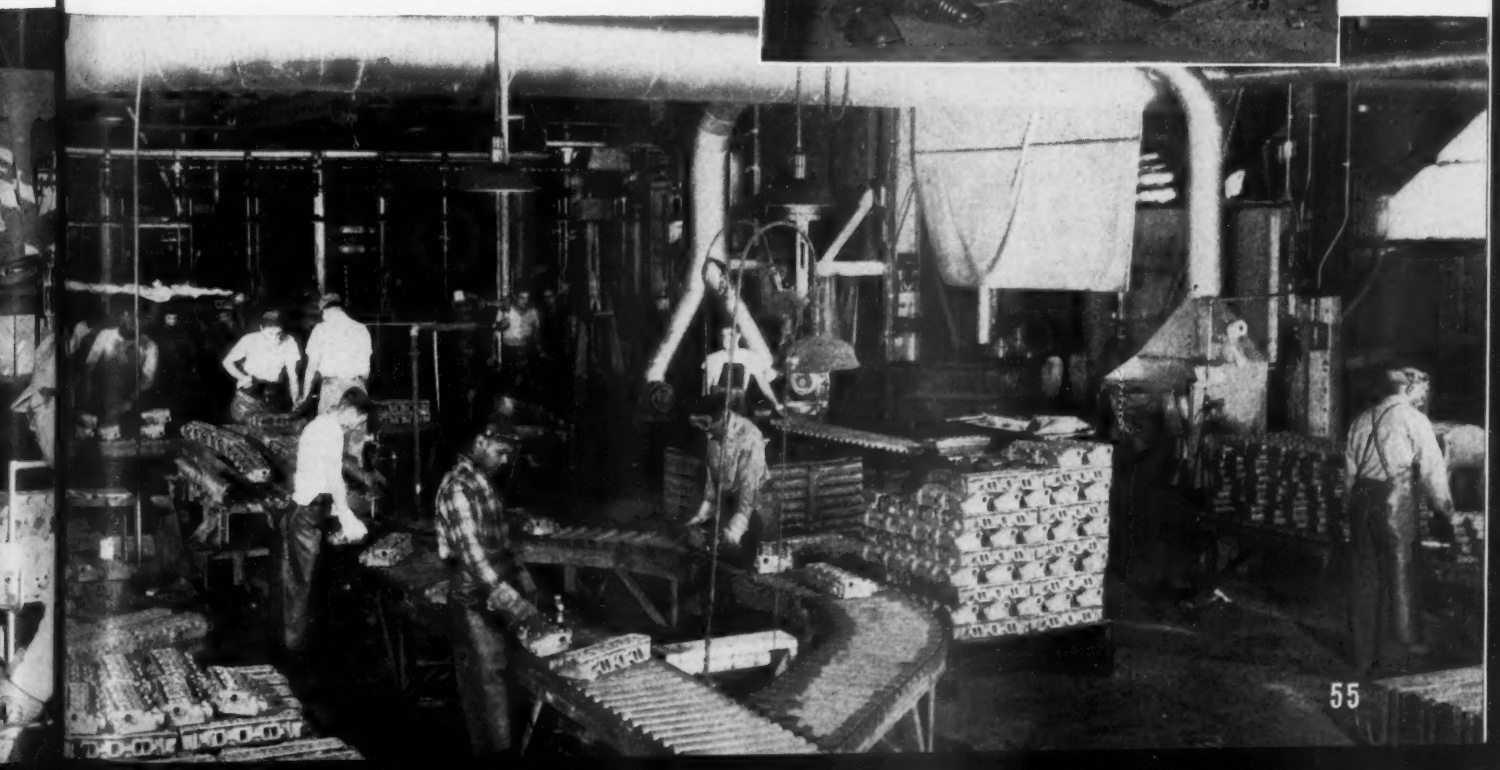


Fig. 56—Dumping castings into a tumbling barrel

tures are loaded with cylinder heads by the casting sorters. They are then pushed on by the sorter and are again engaged by the drag chain and conveyed to a work station where each loaded fixture is transferred by power hoist to the spinner hook conveyor of the centrifugal blast cleaning cabinet. Empty fixtures returning on the spinner hook conveyor are transferred to the power and free conveyor for return to the sorting belt.

Two 25-ft-long spurs leading from the free running section of the track serve for storage of either empty or loaded fixtures and provide a bank between the casting sorters and the cleaning cabinet.

Fragile clutch housing castings, placed on their cleaning cabinet fixtures at the shakeout station of the molding unit, are carried on the lighter casting cooling line through the cooling shed. They pass through the basket dumping station to a transfer station beside the cleaning cabinet spinner hook conveyor. Here the loaded clutch housing fixtures are transferred to the spinner hooks. Empty fixtures are removed from the cleaning cabinet conveyor and placed on the cooling line conveyor to return to the foundry for reloading at the castings shakeout.

The spinner hook chain conveyor, a vital part of the centrifugal blast cleaning cabinet, consists of a trolley chain conveyor with an intermittent indexing drive which advances a distance equal to the spacing of the four blasting wheels and stops for a preset blasting time. The spinner hook assemblies are suspended from the chain trolleys and their spacing is the same as that of the blasting wheels. Each spinner hook assembly consists of a vertical shaft mounted in radial and thrust bearings in a housing suspended from the trolley chain conveyor. Rollers on the housing ride in guides to keep the spinner hook from swinging laterally. Links between hook assemblies hold the hooks rigid longitudinally. A sprocket mounted on the vertical shaft contacts a driven roller chain which parallels the spinner hook conveyor in its travel through the cleaning cabinet. When the hooks are aligned before the four centrifugal blasting wheels they are rotated to present all vertical surfaces of the castings to the shot blast. The wheels are arranged at different elevations to spray the hard abrasive shot at several angles for complete coverage of all horizontal surfaces.

Force of the blast from the centrifugal blasting wheels causes loosely hung castings to swing and tangle with adjacent castings while spinning. The spinner hooks are reasonably rigid but it was necessary to develop a rigid hook-on mounting for the casting-holding fixtures. The spinner hooks are provided with conical points having keys at the base, and the fixtures have snugly fitting tapered sockets with loose fitting notches to straddle the keys. When

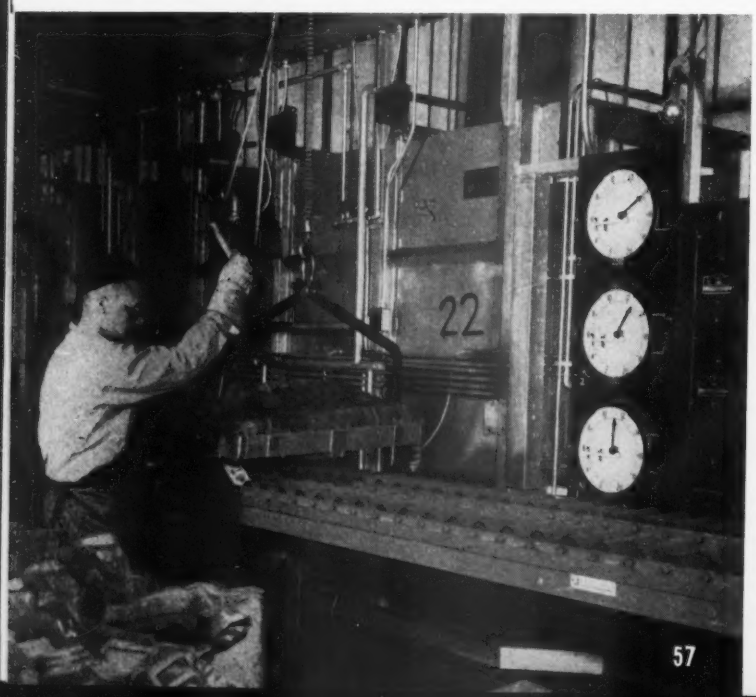
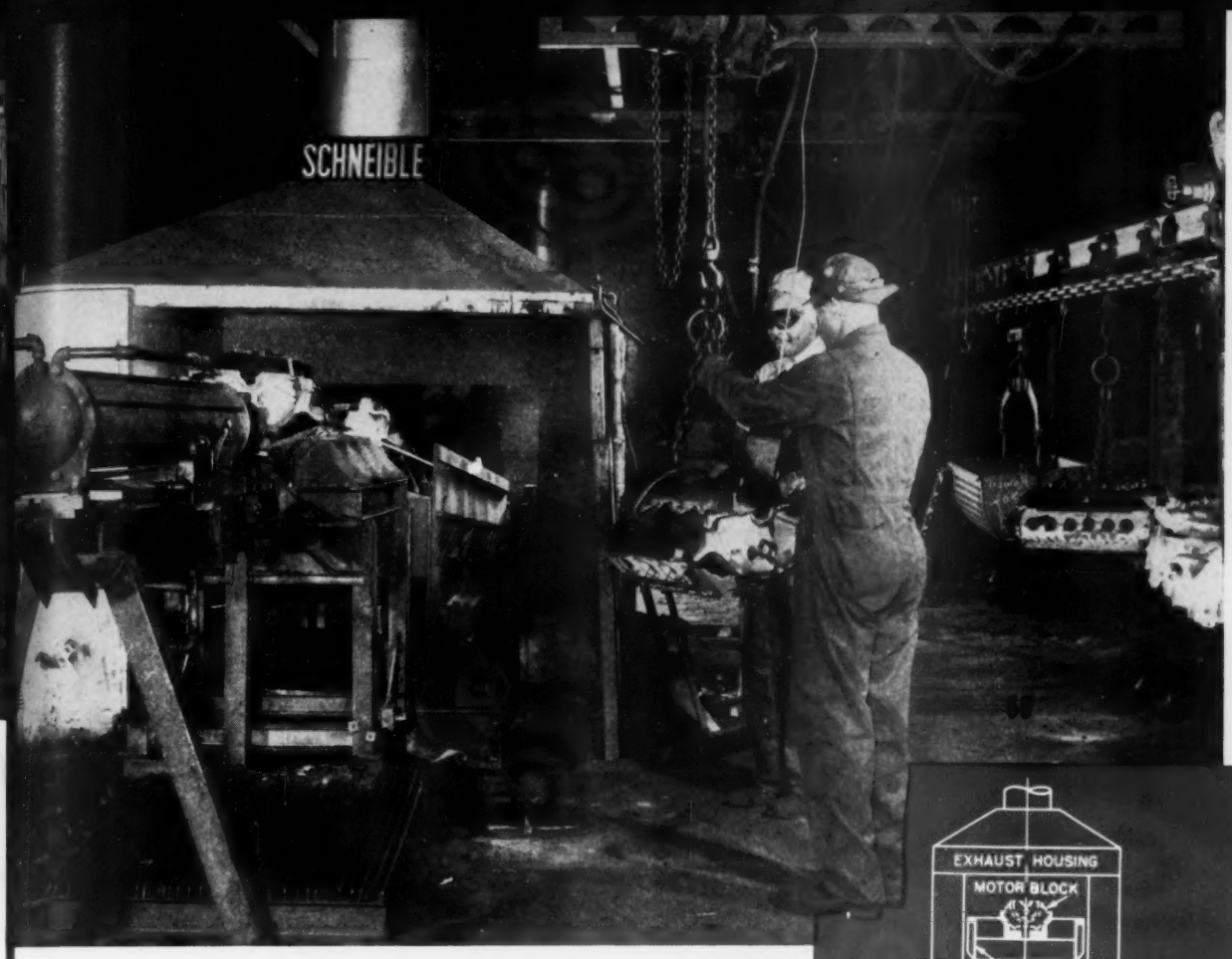


Fig. 57—Hot annealed castings are dumped from alloy steel trays with trunnioned bail grapple



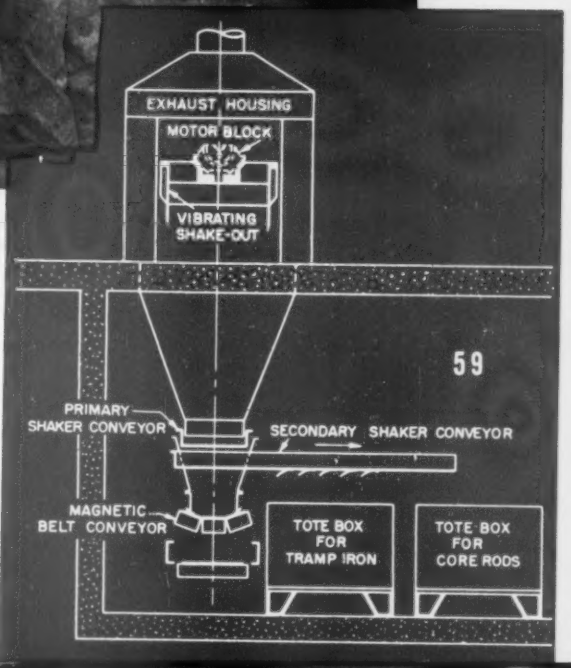
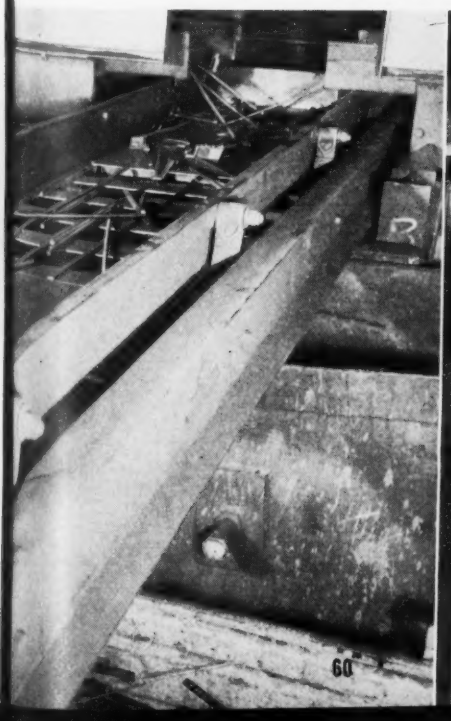


Fig. 58—A cylinder block casting is pushed onto a core knockout vibrating table by means of an air cylinder. Fig. 59—Schematic diagram of core knockout equipment. Fig. 60—Core rods and wires ride over the louvers while the tramp iron falls through. Fig. 61—Sand refuse of the core knockout is screened through the perforated deck plate of a shaker conveyor onto a troughed belt for discharge into a sluice. Core rods, wires and tramp iron are delivered to a sorting shaker conveyor



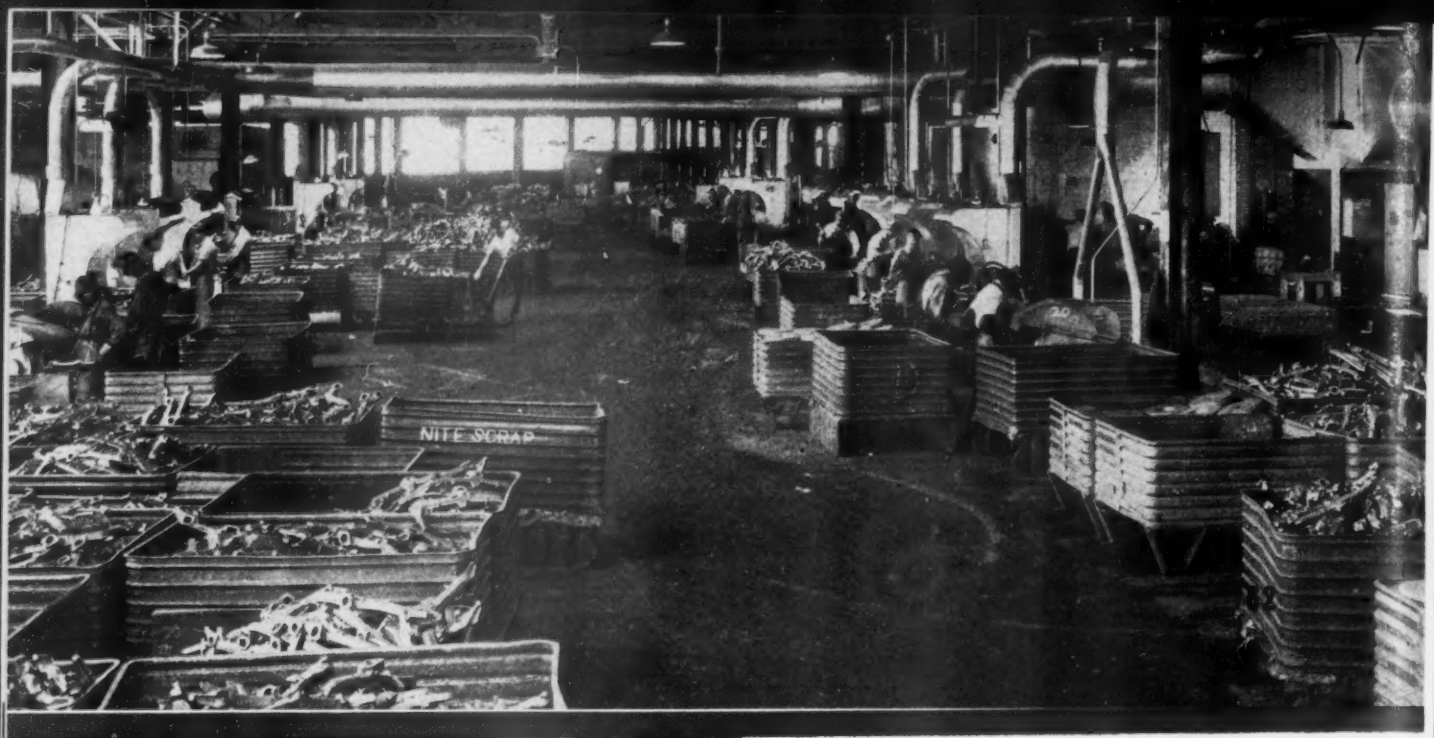


Fig. 62—Manifold finishing department. An exhaust header is provided with a right-angle velocity trap which removes heavy particles and avoids clogging and abrasive wear of subsequent ducts

Fig. 63—All refuse is handled wet by bucket crane from a double dewatering tank

Fig. 64—Fins are removed from cylinder blocks as they ride an apron chipping conveyor

Fig. 65—Cylinder blocks pass through final finishing and inspection on roller conveyors

Fig. 66—Partial view of metallurgical laboratory

a casting fixture is hung on the spinner hook it provides a rigid suspension with no sway. The taper of the cone points and sockets permits easy removal of the fixtures.

While a rigid hook-on construction is necessary for the blast cabinet conveyor, it is not suitable for suspension from the trolley chain cooling conveyor which travels diagonally up and down. A horizontal round bar is welded to the top of the fixture stem on the side opposite the tapered socket to form a *T* head. Hooks on the trolleys of the cooling conveyor engage this *T* head and straddle the suspension stem. This permits the fixtures to swing in a direction longitudinal to the conveyor travel. The load hangs freely, direct from the trolley in its diagonally up and downward travel.

As the castings emerge from the blast cabinet they leave the spinner chain and are no longer rotated. They are conveyed through an area where they are removed from the fixtures and placed on their respective chipping and finishing roller conveyors. Separate finishing conveyors are provided for *L* heads, overhead valve heads and clutch housings. Progressive operations suitable to each type of casting are arranged along these conveyors. When they pass through this finishing department the castings are loaded onto skids for delivery to the machine shop.

Flywheels, bearing caps, gear blanks, exhaust manifolds, water pumps, flanges, etc. are cleaned in 16 tumbling barrels of various sizes, round and square, to suit the variety of sizes, shapes and weights of castings.

Castings in tote boxes are transported by fork lift trucks from the sorting stations to the mill room. Each tote box has three straight sides and a scoop-like end and can be dumped into the tumblers by the fork lift trucks without manual handling. The tumbler is revolved so that the door opening is on top. The fork lift truck is advanced toward the tumbler until the scoop end of the tote box is over the door opening. A grapple on the truck guides engages the back bottom of the tote box and the forks are lowered. The back of the tote box is held in its uppermost position by the grapple hook while the front end moves down with the lowering forks until the castings slide out of the scoop end into the tumbler.

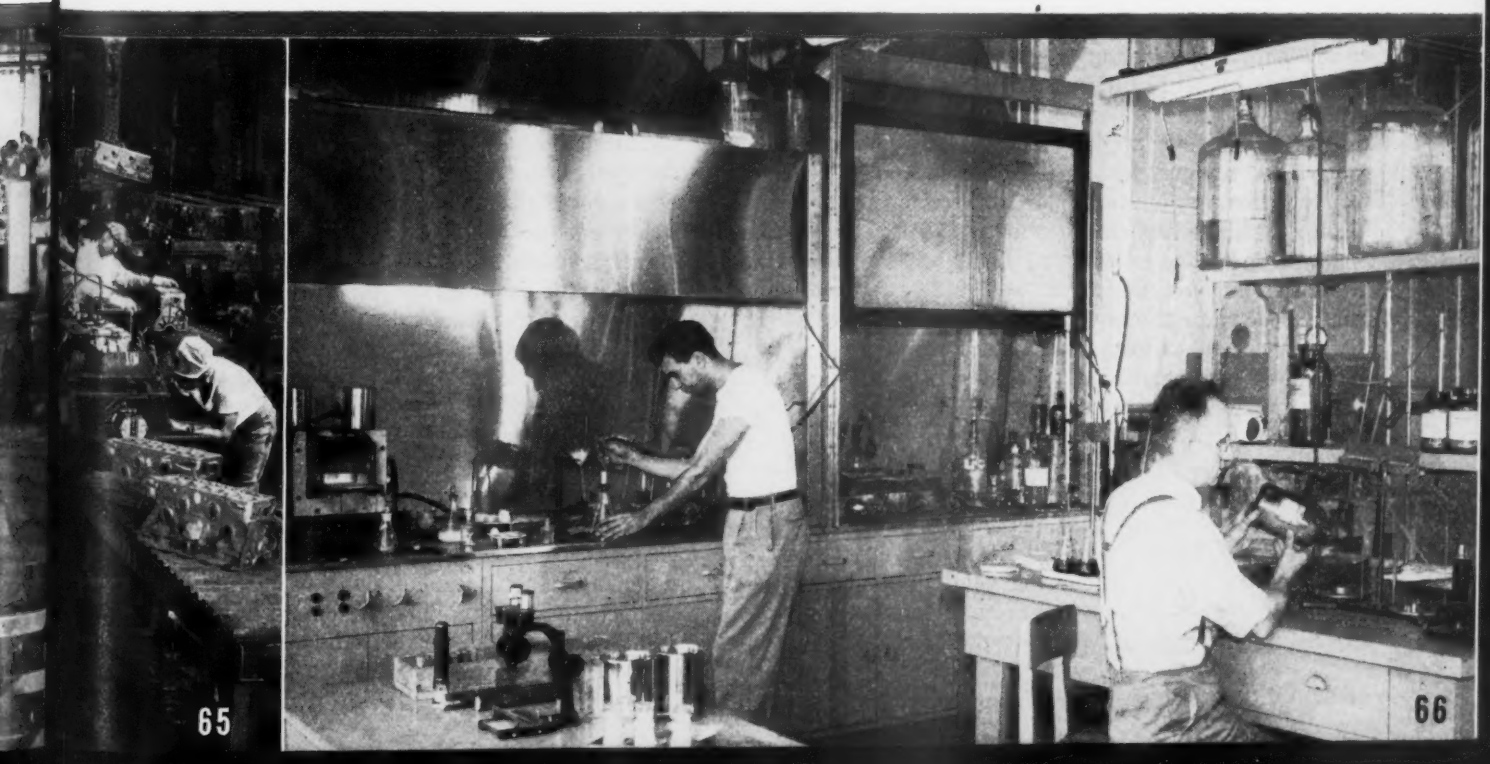
Each tumbler is equipped with an independent, reversible, motor-reducer drive. Direction of rotation is reversed for half the tumbling time. This results in a better cleaning job and reduces the cleaning time about one-fourth.

Intake manifolds and small castings that require shot blasting are cleaned in centrifugal shot blast tumblers. All small castings requiring extensive machining are passed through an automatic cycle annealing furnace. A bail grapple rigidly engaging the ends of the alloy steel trays with trunnion-mounted clamping fixtures provides a quick and easy method of dumping the hot castings from the trays into tote boxes.

Castings are handled in tote boxes by lift trucks through the manifold and flywheel finishing department. The equipment in this department includes four two-wheel grinding stands, a centrifugal shot blast rotary table for reclean and ten chipping cabinets connected to the air exhaust system.

Fork lift trucks, skids and tote boxes, used extensively throughout the foundry, include five 6000-lb and two 3000-lb electric fork lift trucks, one 6000-lb gas-electric fork lift for long hauls, two 3000-lb platform lift trucks, a 1-cubic-yard scoop truck and seven storage - battery - powered, travel, hand - lift trucks, in addition to an assortment of older gasoline and electric haulers for carts. New materials handling equipment includes 250 metal lift truck skids and 400 open-end lift truck tote boxes and many dumping hoppers for handling refuse.

Exhaust from the equipment in each department of the cleaning room is passed (*Please turn to page* 214)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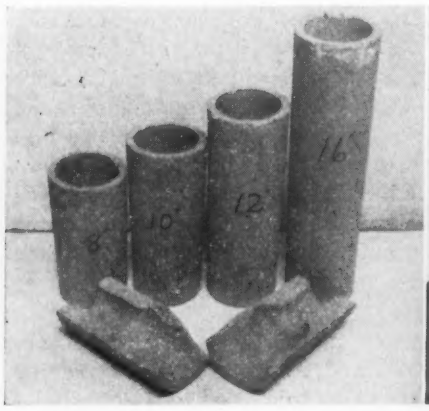
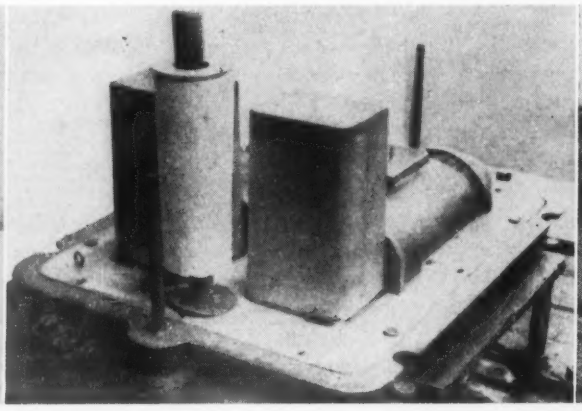
GATES and HEADS for Ste

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.





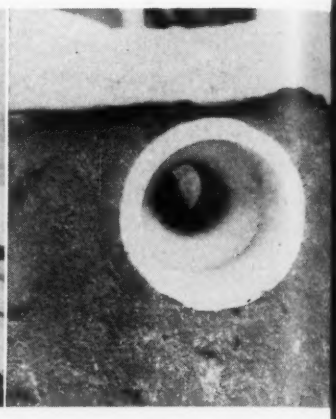


Fig. 1—Four sizes of a combination pouring cup and sprue. One unit has been sectioned to show the shape of the inside. Fig. 2—Pouring core or sleeve set on pattern with a rubber pad to absorb shock of the jolter. Fig. 3—Appearance of the pouring sleeve in place in the mold as seen from above

SOME forty-odd years ago, Henry M. Howe and Bradley Stoughton published[1] results of a careful investigation of the effects of different methods of pouring upon the soundness of steel ingots. As a result of their work, they recommended the adoption of certain definite means of eliminating what the rolling mill man calls the "pipe" in a steel ingot, which is the same thing that the steel foundryman terms a "shrinkage cavity." The late Emil Gathman, who developed the ingot mold that bears his name, told the present author that when he was perfecting his mold, Howe's paper was his "bible," and that he finally wore his copy completely out.

A few years later, in a paper[2] discussing the remedies for defects of various kinds in steel castings, the present author undertook to demonstrate that Howe and Stoughton's recommendations could be applied equally well to steel castings, and showed how the principles involved should be applied to positioning castings in the mold, and to the location and design of gates and sink-heads. Howe and Stoughton showed that the extent and depth of the pipe in a steel ingot is lessened by: (1) Pouring from the top instead of from the bottom. (2) Pouring slowly. (3) Casting the ingot large end up. (4) Placing a refractory-lined sink-head on top of the iron mold. Several other methods also were described, but these are applicable to ingots, and not to castings.

The object sought in all four of the suggested recommendations (some of which were quite new at the time) was to insure that solidification of the ingot should begin at the bottom and proceed toward the top, so that the contraction of each layer as it solidified should be "fed" by the metal immediately above it, the refractory-lined sink-head finally feeding that of the top of the ingot. In this way, the "pipe" was confined to the sink-head and a solid ingot secured. In his paper,[2] the author pointed out that the same considerations apply to castings, and discussed various means by which progressive solidification of a casting from bottom to top could be secured. A good many years afterward the late George Batty coined the phrase "controlled directional solidification"[3] to describe practice in which this desirable state of affairs is attained. As is often the case, this descriptive phase became almost a slogan among steel foundrymen, and served to popularize correct methods in the industry to a much greater extent than did the present author's purely technical discussion of the underlying principles involved.

In showing how to apply Howe and Stoughton's recommendations on methods of pouring ingots to the production of castings, the present author discussed the design and proper location of sink-heads, the importance of placing the casting in the mold with the light sections below the heavy ones, the advantages of using chills to hasten the cooling of the lower portions of the casting, and the various possible ways of introducing the steel into the mold through suitable gates. It is interesting to note in how many ways a number of these recommendations, made in 1914, are still valid, and in what respects later acquired knowledge has shown some of them to have been wrong.

Gating—Getting the steel into a casting made in a sand mold is by no means as simple a matter as pouring ingots in cast iron molds. In the case of ingots, the ladle is brought immediately over the top of the mold, and the stream of steel is discharged straight down onto the "stool" on which the mold is set. There is a certain amount of splash, which makes the low-

This is the first of a series of articles that will discuss the fundamentals involved in designing gating systems and feeding heads employed in the production of steel castings

Steel Castings

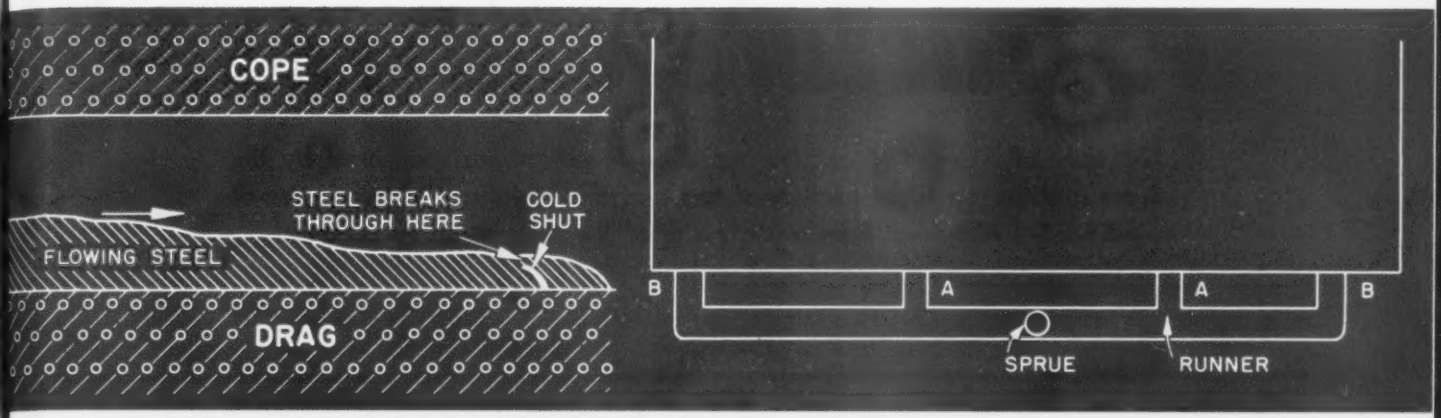


Fig. 4—Sketch of how steel flows along a surface

Fig. 5—Finger gates speed entry of metal into mold

est part of the ingot rather rough on the outside, but a portion of the bottom of the ingot is always cut off at the rolling mill and scrapped, and this "bottom discard" generally includes all of the inferior metal. The impact of the flowing stream, too, wears away the stool to a certain extent, though in many cases the wear is reduced greatly by means of a graphite plug at the center of the stool, upon which the stream of metal strikes. An ingot poured in this way, and provided with a sink-head formed in a refractory-lined piece set on top of the iron mold, is usually completely sound.

As steel castings are of necessity made in sand molds, it is usually impossible to pour the steel directly into the mold cavity, because the falling stream of metal would cut deeply into the sand and carry large amounts of it into the casting. Even if the spot where the steel strikes were made of material that would not be eroded by the impact, the sand around this place would be cut away by the flowing metal, and in many cases steel splashed against the sides of the mold at the start of the pour would form rough areas on the solidified casting. Generally, therefore, the steel must be fed into the casting through separate vertical passages that lead to openings close to the bottom of the mold, or at least part way between top and bottom. The vertical conduits are termed "sprues," any necessary horizontal passages connecting them to the actual openings into the mold cavity are generally called "runners" and the openings are known as "ingates," or simply "gates." As far as possible, these various conduits are so shaped and located that they will lead the metal into the mold freely and rapidly with the least amount of splashing and turbulence.

In certain cases however, sprues, runners and gates are dispensed with and the full stream of metal from the ladle is poured through a sink-head and allowed to impinge directly upon the bottom of the mold. This practice is confined almost entirely to shallow molds of comparatively small size, which are made of chammotte or certain other materials instead of silica sand, and are poured from shank ladles, so that the stream of falling metal can be kept quite small. In this way, the impact of the stream is kept to a minimum, and the attack on the material of the mold is correspondingly reduced. When the steel is handled entirely in a large bottom-poured ladle, the velocity of the steam discharged from the nozzle, especially at the start when the ladle is full, is so great that a mold filled in this way is apt to be severely eroded. Probably because the average steel foundryman is so thoroughly habituated to the use of separate sprues and gates, one does not see this practice followed as often as might be expected.

Even in a comparatively shallow mold, the bottom of the sprue is commonly dished out to form a cup an inch or two deep, so that once pouring is started, the stream of steel may strike in a pool of metal rather than directly upon bare sand. The face of this cup is usually well "nailed" to help hold the sand in place, and whenever possible it should be formed of heavily bonded sand that will resist cutting and washing to the maximum. (*Please turn to page* 236)

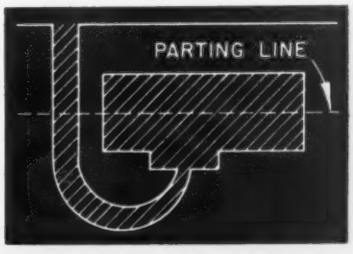
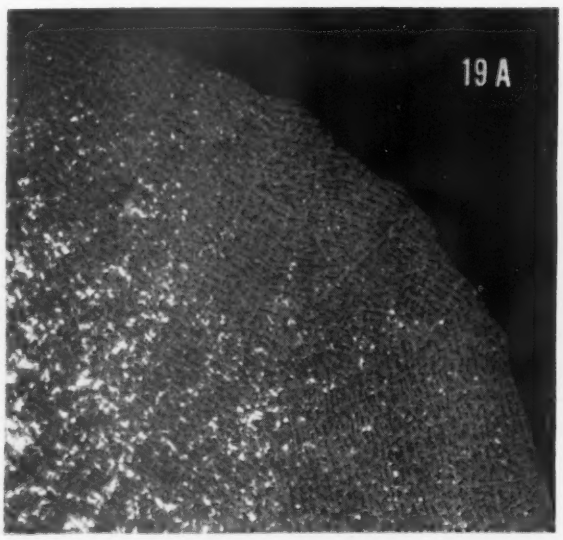


Fig. 6 — Patterns for horn gates are tapered quite heavily

CORRELATION OF

Structure and Test-Ba

This third of a series of articles based on investigations sponsored by the Brass and Bronze Ingot Institute shows that the variations in properties of 85-5-5-5 alloy test bars are a result of the differences in structure



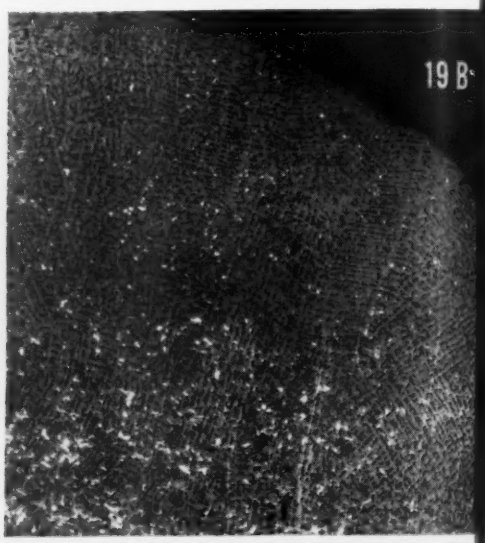
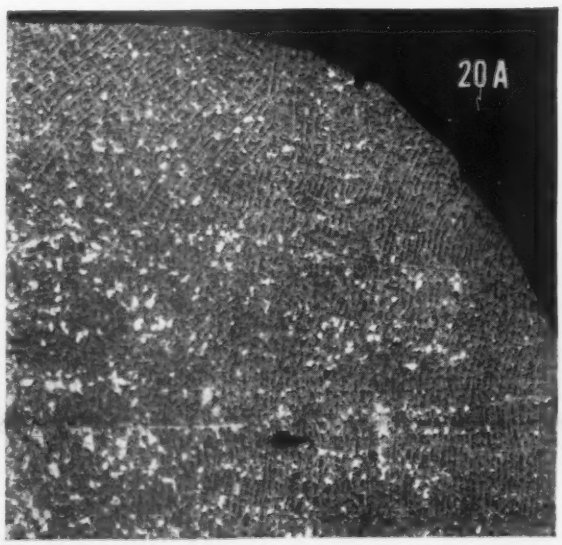


Fig. 19—Horizontal ⅝-in. web-Webbert test bar design. Pouring temperature, °F: A — 2235; B — 2150; C—2020



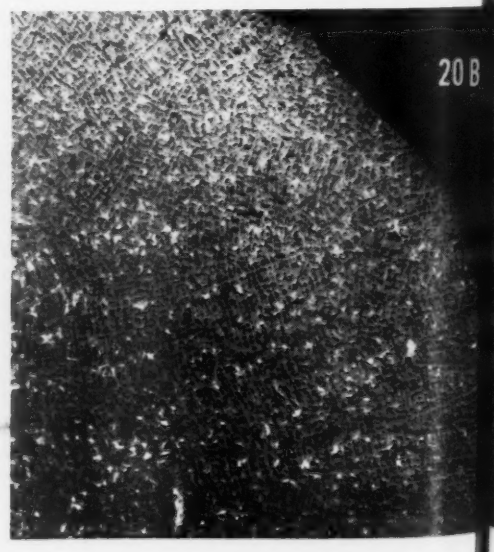
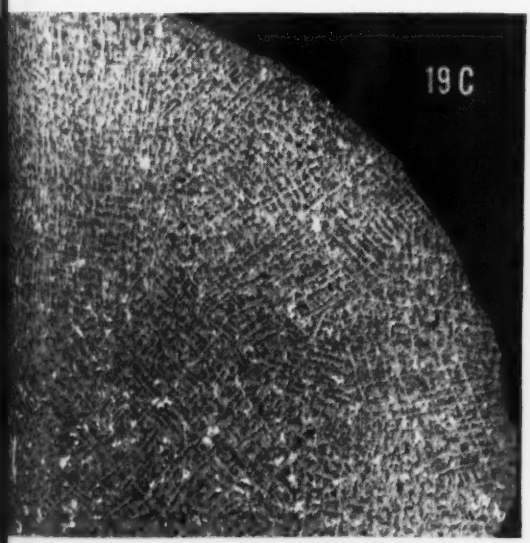
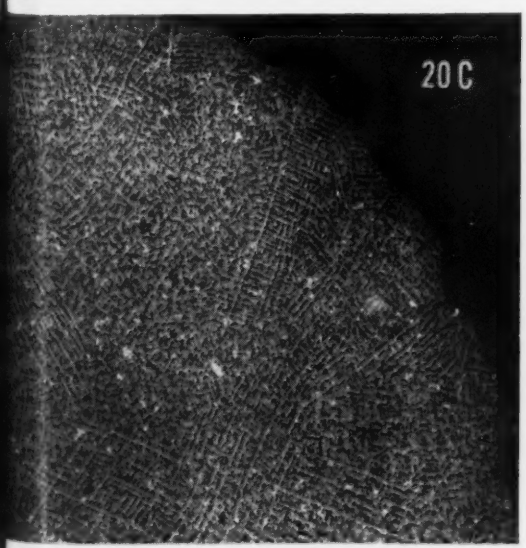


Fig. 20—Horizontal ⅝-in. web-Webbert test bar design. Pouring temperature, °F: A — 2225; B — 2130; C—2035

By J. G. KURA
Assistant Supervisor, Nonferrous Metallurgy
and L. W. EASTWOOD
Supervisor
Battelle Memorial Institute
Columbus, O.

Properties of 85-5-5-5 ALLOY





A PREVIOUS article* contained data on the effects of pouring temperature on the test-bar properties of 85-5-5-5 alloy. Specifically, it showed the average effects of pouring temperature on the test-bar properties of various designs, as well as the effects on individual representative heats. The results also showed that the effects of pouring temperature on the properties obtained from individual heats varied substantially from one heat to another.

The present article will show that the variations in properties are a result of the differences in structure; however, the causes of the differences in structure are not known.

The first article of this series in FOUNDRY, September, 1951, contained a description of the application of the microradiographic technique to the study of the 85-5-5-5 alloy. The second article of this series in FOUNDRY, October, 1951, contained an outline of the general principles covering the correlation between the structure and test-bar properties. Reference to these articles may be necessary for interpretation of data presented herein.

The structures of twenty different test bars are illustrated in this article. In Table I, data on the pouring temperature, test-bar design, tensile properties and fracture appearance are listed for each of the twenty bars subjected to microradiographic examination. From the data in this table, it will be observed that three different test-bar designs have been selected for study and that bars of each test-bar design are represented by two separate heats. The two heats selected were chosen because of their marked differences in the effect of pouring temperature upon the tensile properties obtained.

In general, it was found that the differences in the effects of pouring temperature are reflected by differences in structure, which, in turn, correlate very satisfactorily with the tensile properties obtained. In addition, the striking effects of mold material on the occurrence of microporosity are illustrated by the last two microradiographs.

It should be recalled from the previous article in this series that the enlarged microradiograph of the cross section of the test bar reveals microporosity as light areas and lead particles as black areas. The correlation for the test bars described in this article was originally made by examining the structure of the whole cross section of each bar. For purposes of illustration, however, a representative quarter section of the test bars is reproduced in Figs. 19 to 26, inclusive, all at 15 magnification.

Horizontal 5/8-in. Web-Webbert Test Bars (Figs. 19-20)—The three microradiographs of Fig. 19 should be compared with those of Fig. 20. Fig. 19 represents a series of bars poured over a range in temperature whereby the elongation increases slightly with decreasing pouring temperature and remains high even at low pouring temperature. In contrast, Fig. 20 represents a series of three bars of the same design

*"Effect of Pouring Temperature on Test-Bar Properties of 85-5-5-5 Alloy," by L. W. Eastwood and J. G. Kura, FOUNDRY, September, 1947.

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poured over the same range in temperature, causing a very marked increase in properties as the pouring temperature decreases and then a substantial decrease in elongation at the lowest pouring temperature.

Examination of these six microradiographs shows in a very satisfactory way the reasons for the different properties. Fig. 19A shows that this test bar has only a moderate amount of microporosity (white areas) with favorable rounded lead particles (small black areas). Fig. 19B is quite similar, but shows a lesser amount of microporosity, with the result that a slight increase in elongation and tensile strength occurs. Fig. 19C, however, shows a still further improvement in soundness, corresponding to the very sound fracture, but with only a slight tendency for the lead particles to be angular. The result is a still further increase in tensile strength and the elongation remains high. Although the lead particles in 19C are slightly less favorable than in 19B, the improved soundness apparently compensates for the slightly more adverse lead distribution.

The test bar represented by Fig. 20A has a much larger volume of coarser microporosity than that shown by Fig. 19A. Consequently, a much lower elongation and lower tensile strength are obtained in this bar. Fig. 20B shows a very marked improvement in soundness, the result being a high tensile strength, and a very high elongation value. Fig. 20C, however, shows a still further improvement in soundness, but a very marked tendency for the lead particles to be angular. As compared with Fig. 20B, then, there have been two changes in structure produced by the decrease in pouring temperature. One of these is favorable, the other unfavorable. The angular lead particles have a more adverse effect upon the elongation than upon the tensile strength. The result is that the tensile strength increases somewhat, but the elongation is lower than that obtained at the intermediate pouring temperature.

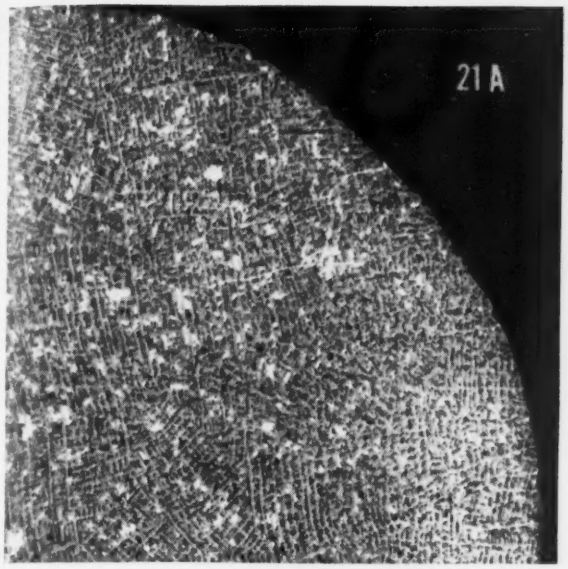
L. T. B.-2 Test Bars (Figs. 21-22)—The three microradiographs of Fig. 21 should be compared with the following three represented by Fig. 22. All six of these microradiographs represent L.T.B.-2 test bars, but the effects of pouring temperature are quite different in the two series. Fig. 21A shows coarser microporosity, with the result that fairly low elongation and tensile strength values were obtained. With decreasing pouring temperature, to 2140° F, Fig. 21B, the soundness of the bars increased very much, without producing any marked adverse effects upon the lead distribution. The result is a very large increase in elongation and tensile strength. Fig. 21C, however, shows very markedly angular lead particles.

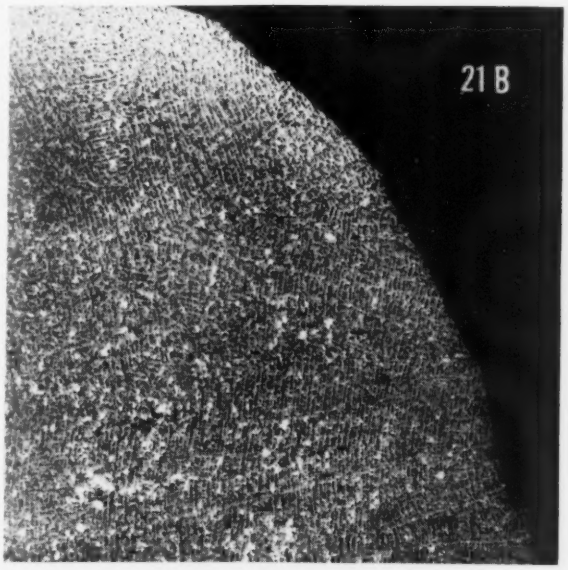
It will also be noted that, as the pouring temperature decreased for this series, the fracture became slightly sounder, i.e., moderately sound at high temperatures to fairly sound at intermediate temperatures and back to moderately sound at the lowest temperature. If microporosity were the only form of

TABLE I—Summary of Data on Test Bars Illustrated by the Microradiographs

Figure No.	Heat Number	Pouring Temp., °F	Bar Design(1, 2)	Tensile Properties: Ultimate Strength, psi	Tensile Properties: Elong. in 2 in., %	Fracture Description
19A	A1655-CL	2235	Horizontal ⅝-in. web—Webbert	35,500	38.2	Very small amount of fine, coppery area
19B	HL	2150		37,700	43.6	Very small amount of fine, coppery area
19C	R	2020		39,300	43.7	No coppery areas visible
20A	A1716-EL	2225	Horizontal ⅝-in. web—Webbert	34,700	30.2	Small amount of coppery area
20B	K	2130		38,100	47.2	Very small amount of coppery area
20C	P	2035		39,900	38.4	Very small amount of generally distributed coppery area
21A	A1655-D	2225	L.T.B.—2	35,000	30.1	Large amount of coppery area
21B	J	2140		38,500	42.4	Columnar, very small amount of coppery area
21C	SL	2005		36,400	24.6	Small amount of generally distributed coppery area
22A	A1642-F	2225	L.T.B.—2	37,600	38.6	Columnar, small amount of generally distributed coppery area
22B	IL	2140		34,100	24.0	Very small amount of generally distributed coppery area with centerline shrinkage
22C	ML	2050		38,300	38.7	Columnar, very small amount of generally distributed coppery area
23A	A1642-C	2240	Navy ⅛-in. web—Webbert	36,100	39.1	Small amount of coppery area
23B	K	2130		38,000	38.2	Small amount of generally distributed coppery area
23C	NL	2045		39,400	34.3	Small amount of generally distributed coppery area
24A	A1716-BL	2245	Navy ⅛-in. web—Webbert	33,600	25.1	Small amount of generally distributed coppery area
24B	L	2120		38,000	35.3	Very small amount of generally distributed coppery area
24C	SL	2010		39,600	34.5	Very small amount of generally distributed coppery area
25	A3820-A	2200	Horizontal ⅝-in. web—Webbert—poor melt quality	22,500	11.0	Very large amount of coppery area
26	A3820-B	2185	Same, but cast in calcined clay mold, baked at 1600°F, and cooled to 300°F	38,100	47.3	Trace of coppery area

(1) Sketches of the test-bar designs are presented in Fig. 6 of the second article of this series.
(2) Mold consisted of natural green sand, except where noted otherwise.





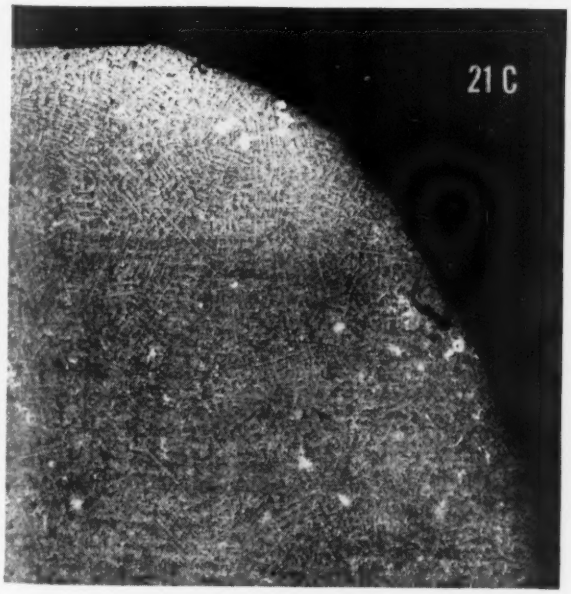
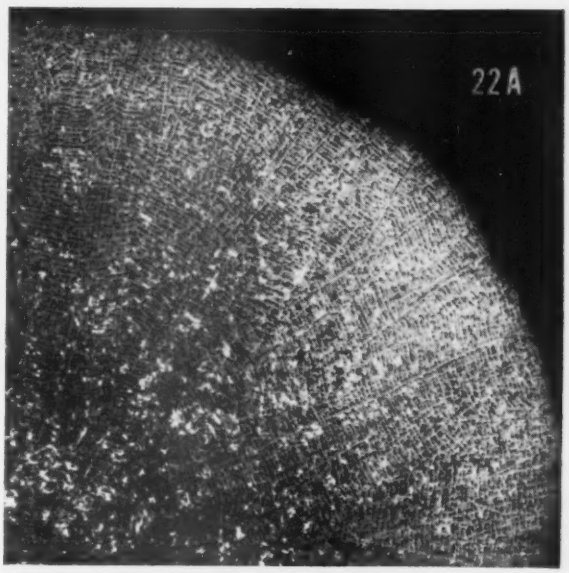
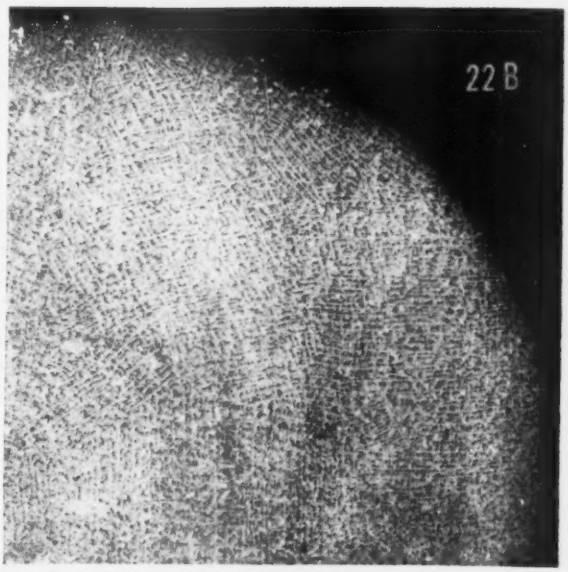


Fig. 21—L.T.B.-2 test bar design. Pouring temperature, °F: A—2225; B—2140; C—2005





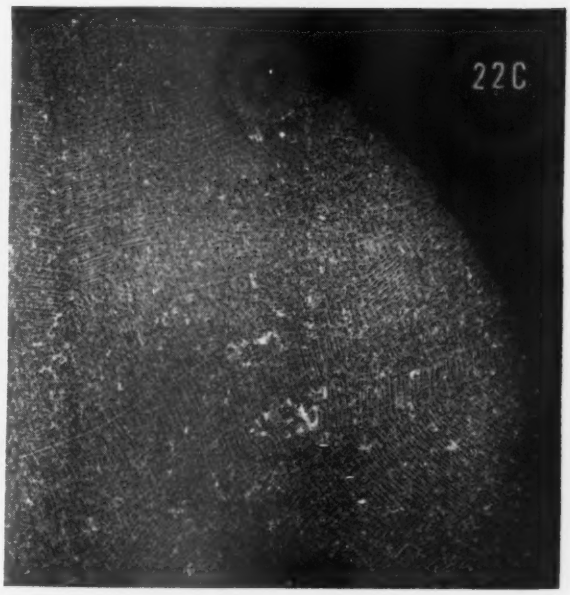


Fig. 22—L.T.B.-2 test bar design. Pouring temperature, °F: A—2225; B—2140; C—2050

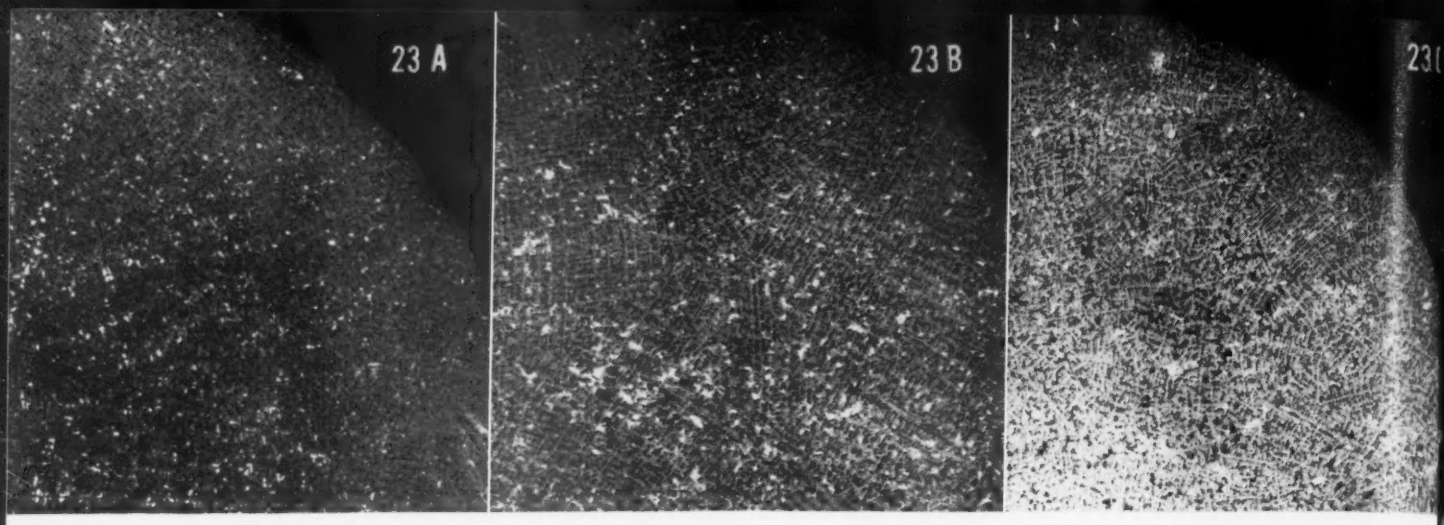


Fig. 23—Navy 5/16-in. web-Webbert test bar design. Pouring temperature, °F: *A* — 2240; *B* — 2130; *C* — 2045

unsoundness, the soundness of the fracture should improve with a decrease in pouring temperature. The increased unsoundness of the bar represented by Fig. 21C is probably due to some generally distributed shrinkage not clearly shown on the microradiograph, but apparently observed on the fracture. The combination of this unsoundness and the angular lead particles has produced a rather low tensile strength and a very low elongation value.

As compared with Fig. 21A, Fig. 22A shows finer, more generally distributed microporosity and, consequently, higher elongation and tensile strength values. Fig. 22B shows that the decreasing pouring temperature has increased the soundness, but the lead particles are still rounded. This structure should correspond to high tensile properties. However, as noted on the fracture rating, this bar revealed centerline shrinkage on the fracture. Because this shrinkage is localized, it so happened that none of this unsoundness occurred in the thin section microradiographed. This is a good instance whereby the structure revealed by the microradiograph does not correlate with the properties because the precise conditions at the fracture are not represented. Data on the fracture appearance, however, clearly show the reason for this discrepancy.

It has been repeatedly observed that even small amounts of shrinkage in 85-5-5-5 alloy tests bars will cause a marked reduction in tensile strength and a very marked reduction in elongation values. Fig. 22C shows a fairly sound bar, corresponding to the fairly sound fracture. The lead particles are unusually rounded for this pouring temperature and, for some reason, colmunar grains rather than equiaxed grains were formed. Columnar grains are clearly indicated by the configuration of the dendritic pattern shown on the microradiograph.

As the result of the fairly high degree of soundness and the absence of angular lead particles, rather good elongation values were obtained for this pouring temperature. Thus, the heat represented by Fig. 21 shows a marked maximum at the intermediate temperature, and low properties obtained at the lowest temperature. Fig. 22 represents a heat which produced a marked minimum in elongation values at the intermediate pouring temperature. These differences correlate very satisfactorily with the structure revealed by the fractures and microradiographs.

Navy 5/16-in. Web-Webbert Test Bars (Figs. 23-24) —The Fig. 23 series of three microradiographs represents a heat which showed markedly different effects of pouring temperature than the one represented by the following microradiographs, Fig. 24. As the pouring temperature of the heat represented by Fig. 23 was decreased, there was first a slight decrease in the amount of soundness and a slight increase in the angularity of the lead particles, even at the intermediate pouring temperature. The result is that elongation values remained about the same, though the tensile strength increased somewhat. This increase in tensile strength is within expectation because slight angularity of the lead has less adverse effects on the tensile strength than upon elongation.

However, at the low pouring temperature, there was a marked decrease in the amount of microporosity formed, but the lead particles became markedly angular. The net result of these two changes in structure, one favorable and the other unfavorable, is a small though substantial decrease in elongation value. The tensile strength increased, however, by this change because, as previously observed, the tensile strength is less adversely affected by angular lead then is the elongation value.

As compared with Fig. 23A, Fig. 24A contains a very much larger amount of microporosity, resulting in rather low elongation and tensile strength values. With a decrease in pouring temperature, to 2120° F, a very marked improvement in the soundness was produced, as shown in Fig. 24B, though, again, there is a slight tendency for angular lead to occur near the periphery of the bar. This is not marked, but it probably accounts for the absence of a very high elongation value. The net effects of this structural change produced by decreasing the pouring temperature to 2120° F are a marked increase in tensile strength and a very marked increase in elongation value. However, when the pouring temperature is decreased to 2010° F, the grains are fairly equiaxed, as shown by the configuration of the dendrites in Fig. 24C.

There is a marked decrease in the amount of microporosity, but the lead particles are very angular.

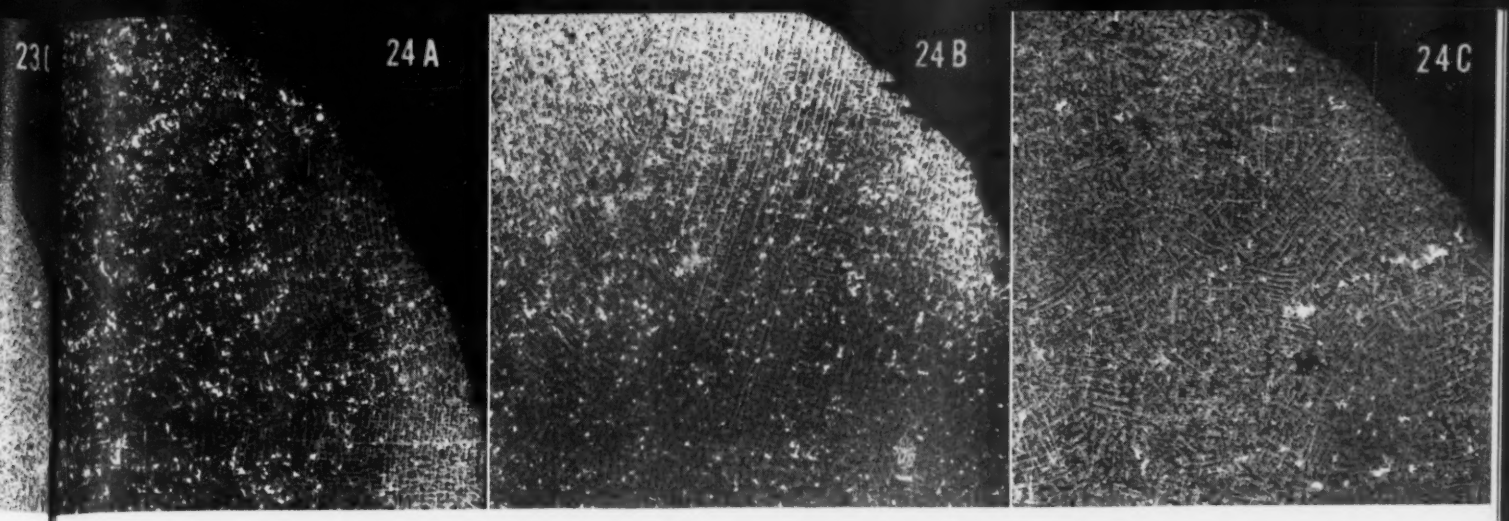


Fig. 24 — Navy 5/16-in. web-Webbert test bar design. Pouring temperature, °F: A — 2245; B — 2120; C — 2010

The net result of these two changes, one markedly beneficial, the other harmful, is a rather low elongation value, but an increase in tensile strength, as would be expected. In general, the three microradiographs of Fig. 24 represent test bars having rather low elongation values. The bar represented by Fig. 24B has only fair elongation values, probably because of the tendency for slightly angular lead to occur near the periphery.

Effects of Mold Material—The Fig. 25 microradiograph shows the typical large amount of microporosity produced when a high-gas-content melt (low-quality melt) is poured into green sand for this fairly high pouring temperature. This test bar and the one represented by Fig. 26 were poured from the same melt and under similar conditions. The only difference is that the mold for the latter was made of calcined clay baked at 1600° F, then cooled to 300° F before pouring. It is evident that the melt quality is closely related to the mold material used. Gassy or poor-quality melts are poor only if gas, probably oxygen, is also absorbed by the melt from the moisture and steam generated in the mold. The lead particles are slightly more angular in the test bar poured in the calcined-clay mold than in those obtained under similar conditions in green sand. This is a direct result of the slightly slower cooling rate in the calcined-clay mold.

Acknowledgments—The authors of this series of three articles wish to express their appreciation to the Brass and Bronze Ingot Institute who have sponsored this experimental work and who granted permission for the publication of the results; to the Research Subcommittee—G. P. Halliwell, chairman, H. L. Smith, A. H. Hesse—and J. F. Ednie, former member of the committee, who have assisted in the direction of the work, and to the Editorial Committee —W. Westphal, G. P. Halliwell, and F. Satikas—who have ably reviewed each article before publication. The authors also extend their thanks to their many fellow staff members at Battelle who have assisted in this work.

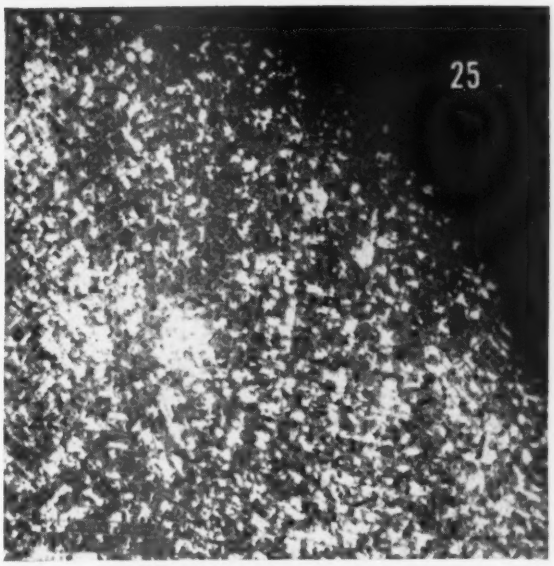


Fig. 25—Horizontal 5/8-in. web-Webbert test bar design. Pouring temperature 2200°F. Density 8.21. Poured in natural green sand mold

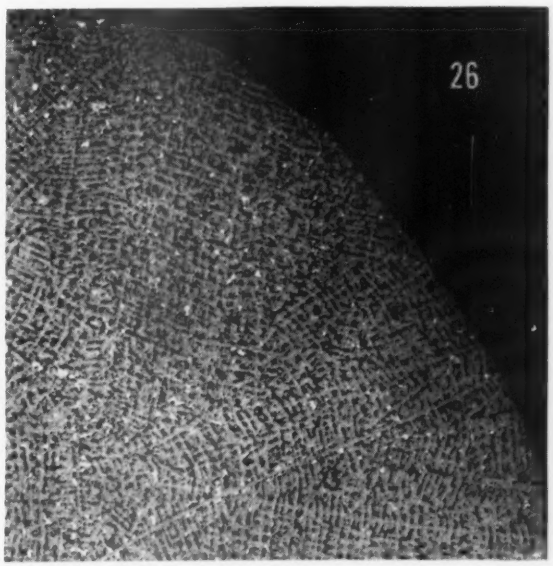


Fig. 26—Horizontal ⅝-in. web-Webbert test bar design. Pouring temperature 2185°F. Density 8.82. Poured in calcined clay baked mold

Editor's Note: For corrections to the October installment of this series, see p. 207.

QUESTIONS and

Foundation for Breaking Scrap

Q.—It is our understanding that you have published some time in the past, some information concerning foundations under areas on which cast iron scrap is broken up.

A.—While mention has been made from time to time in FOUNDRY of the practice of breaking up large scrap castings to a size suitable for charging into the cupola, nothing has been said relative to the base or foundation on which the operation is carried out. In fact, in many instances the starting point is to place the heaviest pieces on the ground to form the base, and the other pieces to be broken on top. Possibly instead of placing the pieces on the ground, a base of heavy timber such as old railroad ties could be used.

For a substantial permanent foundation or base we believe a reinforced concrete mat about 3 ft thick should serve. However, to prevent spalling or gouging of the surface due to blows from the skull cracker, it should be protected by armoring with heavy steel plates or perhaps with a grid formed of heavy steel plate imbedded vertically in the top 3 or 4 in. of concrete.

Manhole Cover Swells in Cope

Q.—Lately we have been troubled with swellings in the center of the cope side of manhole castings 24 in. in diam made in a 30 x 30-in. flask with three bars in the cope. The peculiar feature is that some of the castings show this swell and some of them are perfectly flat. They are all made from the same pattern. The swelling usually is between 4 and 6 in. diam. We do not believe the swelling is caused by ramming irregularity.

A.—Basing an opinion on the appearance of the cope face of the casting as shown in the small photo which accompanied your recent inquiry, we should say you are quite correct in claiming that the method of ramming the sand is not responsible for the defect. The excrescence over the center of the casting is metal which filled a certain space in the cope after the sand in that space had dropped. This sand did not fall until the mold was partly filled with iron. The sand broke into a great number of small parts and floated until it came into contact with the cope face of the mold at various points. This explains the ragged appearance of several small ribs and bosses.

A possibility exists that your sand is too weak for this class of castings. However, that theory is contradicted by the fact that many of the castings are satisfactory. The most probable cause of your trouble is the manner in which the sand is manipulated in the drag. And that in turn may be boiled down into a single sentence—the drag mold is not vented properly. Since the casting covers almost the entire joint face of the drag, it is apparent that all the generated steam and gas must escape downward. The normal volume of steam and gas is augmented to a considerable extent by the eight ribs which extend from the center to the perimeter, and especially where the ribs form a pocket at the center.

Where the steam and gas cannot escape readily and rapidly, a certain amount escapes upward through the metal. This metal, jumping and boiling, strikes the sand in the cope and washes it down. That is what happened in the present instance. The obvious remedy is to vent the drag copiously with a wire before the drag is rolled over. The thin layer of sand between the bottom board and the drag is scratched or dented with the edge of a straight edge to facilitate escape of the gas and steam that come down through the vent wire openings.

Method of Charging at Fault

Q.—We have been having considerable trouble with porosity in our gray iron castings which seems to come and go through the heat. Pouring temperature ranges from 2700 to 2800°F, and our cupola seems to be operating properly. Since we have difficulty in getting pig iron, we are forced to use 80 per cent scrap composed of motor blocks with the crankshafts removed and No. 1 machinery scrap. We have some trouble occasionally in controlling moisture in our sand, but the metal seems to lie quietly in the molds. Samples showing the defect are being forwarded for inspection.

A.—The specimen castings submitted contain numerous small holes just under the surface, revealed after machining operations, and in our opinion are pinholes resulting from gassy metal. All the holes have bright, shiny interiors which precludes their formation by steam from the mold; steam would cause a dull, oxidized appearance. Gassed metal may arise from several causes, including moist or damp ladle linings and cupola runner spouts, presence of aluminum or other nonferrous materials, and faulty cupola operation.

Damp ladle linings are a prolific source of gassy metal, but after being used a few times the linings are dried and the trouble eliminated. However, you mention that the trouble is sporadic throughout the heat, and unless newly lined ladles are being put into service at intervals, it would seem that trouble lies elsewhere. Presence of nonferrous metals might be a possibility, but not too likely since you mention the crankshafts are removed, and we assume that means

answers

the pistons too. The amount of bearing metal, mainly copper-lead alloy, likely would not cause any trouble.

That leaves one possible cause—the charging of the cupola with cylinder blocks. It may be that at times they are charged carelessly so that an extremely open charge results, and the bed burns away sufficiently to permit some oxidation to occur. On later charges the bed would build up to the normal operating range, and the troublesome condition would be eliminated.

Wants To Dispose of Grindings

Q.—We would like to know if there is any market for aluminum alloy grindings, sawings and dust which are a by-product of sawing and grinding operations in the foundry. We know from experience that dealers and smelters are unable to use this form of scrap because of its tendency to completely oxidize and burn at aluminum melting temperatures. We also are unable to use the material in our reverberatory furnace for the same reason.

A.—We cannot offer any suggestions on possible markets for aluminum alloy sawings and grindings. Possibly you might be able to obtain some recovery by introducing the fine material beneath the surface of the molten bath in the furnace so that the least exposure to furnace gases is obtained. That might be accomplished by using a steel pipe of suitable size extending outside the furnace walls with the other end beneath the bath surface. Material is forced beneath the surface by a plunger. If a hearth type furnace is available, a small chamber opening to the outside and walled off from the main furnace body could be installed. Lower end of the chamber would extend a few inches below the bath surface, but opening into it. Chamber is filled with the fine material, which dissolves in the molten bath below.

Cores Stick to Drier Shells

Q.—Some of our large cores stick to the drier shells. We have painted the inside of the drier with coal oil, but without result. We shall appreciate information on any substance which applied to the face of the drier by brushing or swabbing, will prevent the cores from sticking.

A.—We would be in better position to consider your problem and suggest a solution if you had been a little more explicit or had furnished further particulars. Cores stick to the driers from any one of four principal causes. Naturally, they also will stick from any combination of these causes: 1. The sand is mixed too wet. 2. Too much binder or clay in the sand mixture. 3. No vent holes along the bottom and sides of the drier. 4. Cores are not baked thoroughly. Anointing the drier shell with oil or any other material will not prevent the cores from sticking if any one or a combination of the foregoing conditions is present. If the shape of the drier makes the practice feasible, a single thickness of newspaper placed between the core and the shell will prevent the core from sticking, even though other conditions are not as favorable as they might be.

Foundry Fumes Cause Complaint

Q.—We operate a nonferrous foundry with a melting room containing four oil-fired crucible furnaces. Ventilation of the room and exhaust of fumes is obtained through ample louvers located around the building at the bottom of the wall for intake of fresh air, and by natural draft ventilators in the roof (18 ft above floor). However, we have been receiving complaints from the city pollution engineer that the gases emitted, while not poisonous, are a nuisance due to color, smoke and odor. Can you give us suggestions on eliminating this nuisance complaint?

A.—Your mention of color and smoke indicates that a considerable amount of your production is in yellow brass which emits considerable zinc fume. Amount of zinc fume generated can be regulated to some degree by controlling melting temperatures so that the alloy is heated sufficiently above the pour-

GANGWAY!

By J. A. PATTERSON

"Sir, are you criticizing my rendition of 'The Missouri Waltz' as a music critic, or as the boss?"

QUESTIONS *and Answers*

ing temperature to provide for skimming and transportation to the pouring station, since the higher the temperature the more zinc fume is produced. Another means is use of a viscous cover flux in the crucible which will prevent, in a large measure, escape of the fume to the atmosphere. When ready to pour, a hole is poked in the cover at the lip, and one at the back to permit entrance of air.

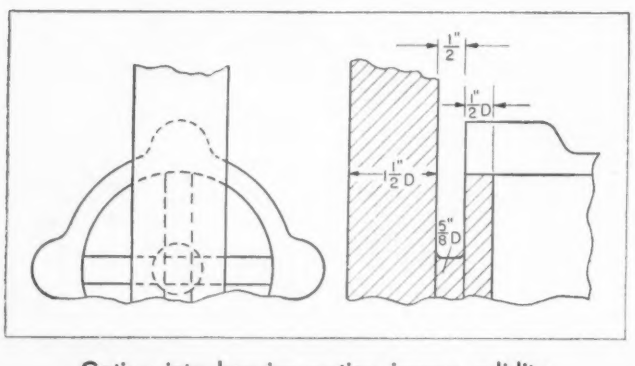
Another possibility is the use of a small addition of aluminum to the brass. The aluminum (2 or 3 oz per 100 lb) oxidizes and forms a tenuous film or skin over the molten metal which prevents in some degree escape of zinc fumes. However, the aluminum oxide skin or film tends to form inclusions on the surface or in the solidified metal.

If these corrective measures do not stop the complaints, you may have to install collecting equipment. In the melting room this can be accomplished by placing hoods over the furnaces and exhausting the gases through an arrester. The same could be applied to the pouring stations. To obtain satisfactory results it is advisable to have the whole installation designed by a company with experience in dust and fume control.

Heavier Sections Need Feeding

Q.—We are manufacturing gray iron cylinder castings for hydraulic units. They must withstand 1500 psi without oil leakage, and we are having difficulty with leakers. At present the cylinder (13 in. long, 3 in. ID and 3¾ in. OD) is cast horizontally with a horn gate on the bottom half 2 in. from the end, with a sow gate in the cope which crosses the horn gate. It is poured on an incline from the highest end. We have tried feeding without results. Best results have been from a blind riser at the top end. Twenty per cent pig iron (2.50 per cent Si, 0.037 per cent S, 0.575 per cent P, and 0.75 per cent Mn) is used with good clean cast scrap. Percentage of defective castings has been 18 per cent. A specimen showing the defect is enclosed.

A.—The small shrinkage area shown in the specimen submitted is due to the difference in cooling rate between the main body of the cylinder and the enlargements at the end designed to accommodate the studs. Enlargements are about twice the thickness of the remainder of the cylinder, and freeze or solidify slower. Since the lighter section freezes first, no metal for feeding reaches the heavier sections. Apparently the difference in cooling rate is not too great or the defective area would be more pronounced, and we believe that you can obtain sound sections by a slight change in gating.



Gating into heavier section insures solidity

We suggest that you cut cross gates in the ends of the core so that they will feed the heavier sections, and those in turn are attached to the sprue at one end, and a riser at the other. The riser and the sprue should be located as close to the casting as possible. Casting should be poured without any inclination. Suggested dimensions are ½-in. square for the cross gates, 1½ in. diam sprue and riser, and ⅝-in. diam connection between sprue, riser and cross gates. Possibly you might find it advantageous to substitute 15 per cent steel scrap for a like amount of cast scrap.

Wants To Build a Small Cupola

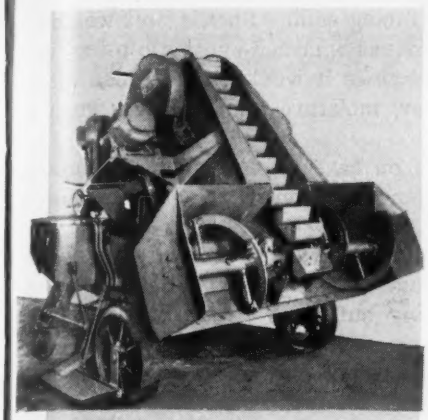
Q.—We are considering the installation of a small cupola in a foundry where most of the castings are for the maintenance of vital machinery and where production and delivery time are the most important factors. We shall appreciate general information, including titles of books and technical articles, to guide us in the design, construction and operation of the cupola. It will be used only once or twice a week for a 2 or 3 ton heat on castings ranging from 50 to 1600 lb. Occasionally it may be necessary to melt iron for a 3-ton casting. Pig iron is scarce, but large quantities of steel scrap are available. Do you think a 16 or 18 in. cupola would meet our requirements? Main features to be considered are these: Diameter at melting zone; depth of well, or distance below tuyeres; design, size, number of tuyeres; height of charging door.

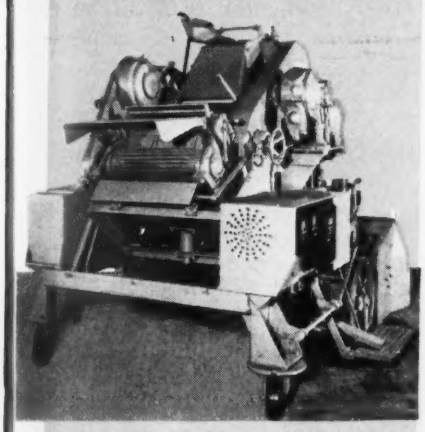
A.—A complete answer to your questions and conditions, also the answers to hundreds of other possible questions are contained in the AFS *Handbook of Cupola Operations*, which is available from the Book Department of FOUNDRY, for $10.

On account of your minimum and maximum requirements an 18-in.-diam cupola would not serve your purpose. Melting capacity of this cupola, approximately 1000 lb per hour, is sufficient for the 1600-lb casting, but is totally inadequate for the 3-ton casting. The cupola can melt 3 tons, but would take 6 hours to do it. There is a practical limit to the time molten metal can be held in a ladle, especially when the ladle is filled from a succession of small taps.

Our suggestion is that you buy or build a cupola 27 in. ID, 41 in. OD, with a 7-in. lining up to the charging door and a 4-in. lining in the remainder of the stack. Height of the charging door is not an important factor. With a blower delivering 1250 cfm at a pressure of 6 to 8 oz., the cupola will melt approximately 5000 lb per hour.

(*Concluded on page* 120)





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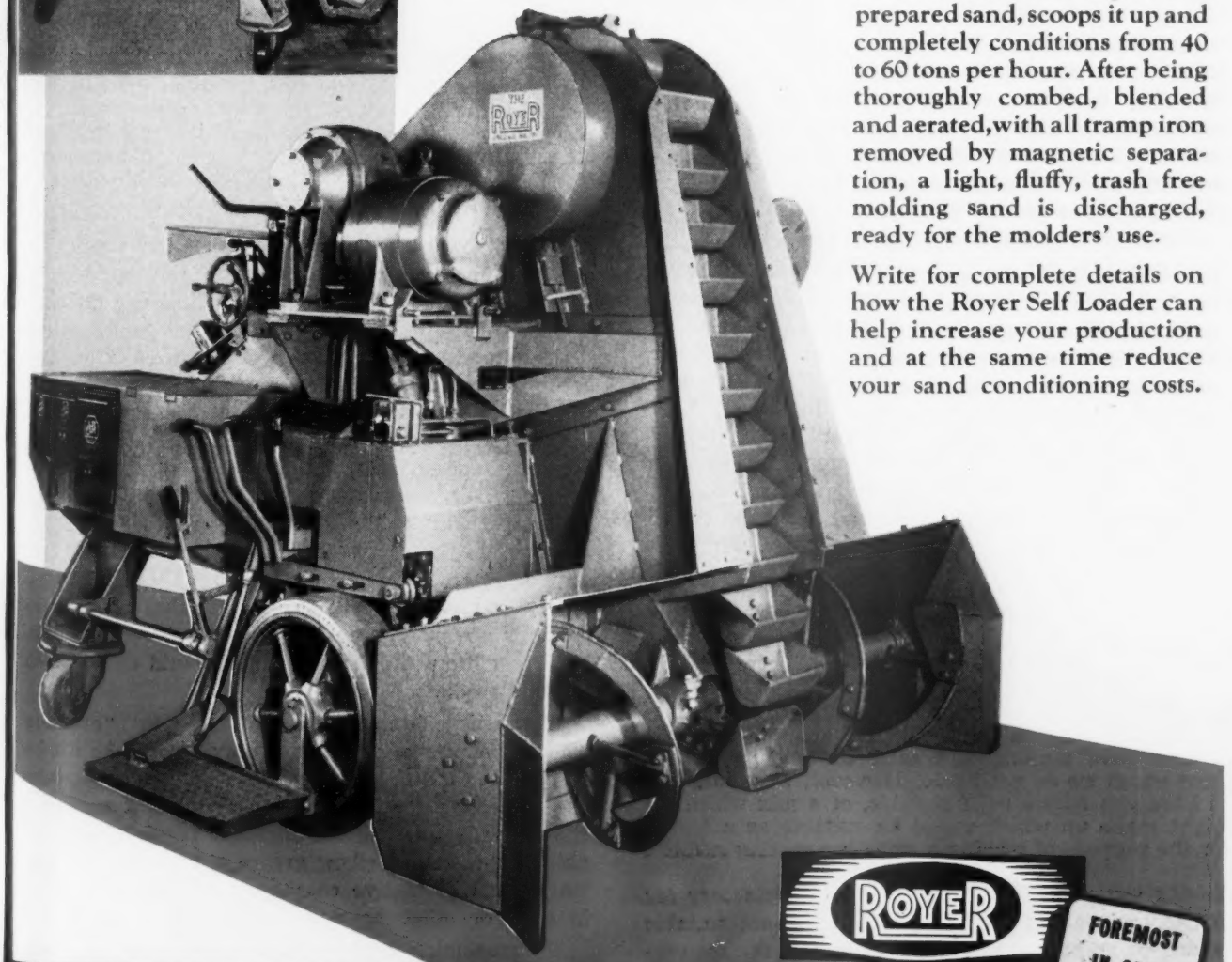

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QUESTIONS *and Answers*

(*Concluded from page* 118)

This will take care of your occasional 3 ton casting. On other days when the floor is covered with an accumulation of small molds, and where presumably the work is handled by a small number of men, the melting speed may be cut down by reducing the volume of air entering the cupola. Method will depend on the blower drive setup. Simplest and easiest method is either partly closing a gate in the blast pipe, or by opening the outside lid on one of the tuyeres and thus allowing a certain amount of air to escape.

Cleans Bronze Casting Surface

Q.—Please advise us if it is possible to obtain a surface free of oxide in bronze castings. Phosphor bronze proves a little too hard for our purpose. Can you refer us to any literature?

A.—Your reference to a "surface free of oxide" in bronze castings is not quite clear to us, but we assume that you mean those whose surfaces exhibit dark discolored patches instead of a uniform reddish color. Such discoloration may be removed by blasting with copper shot or sand, or by acid dipping or pickling. Blasting with copper shot is preferable to use of sand since no metal is removed in the process. Dipping in acid composed of 12 oz of sulphuric acid with 4 oz of sodium dichromate per gallon of water may be used to obtain a semi-bright finish. Lead-lined or ceramic stoneware tanks should be used. Castings are rinsed in running water and then in hot water containing ⅛ to 1 oz soap per gallon.

Since you do not mention what service is expected from the castings, it is hard to suggest a suitable copper-base alloy. Possibly the 85 per cent copper, 5 per cent tin, 5 per cent lead and 5 per cent zinc alloy commonly called ounce metal, would serve. It is widely used for valves and fittings.

Should Use Finer Facing Sand

Q.—A number of foundries are using synthetic mix for their molding sands. Usually such concerns, we believe, have mulling and sand conditioning equipment which we do not have. However, we would like to have you advise us if possible, of a mix which we might make up which would be suitable as a facing for the purpose of making a smoother casting surface.

A.—As you indicate, it would not be satisfactory for you to try making a synthetic sand without suitable mixing or mulling equipment since one of the requirements is thorough coating of the sand grains with the binder, such as clay or bentonite. However, it appears that you would be wise to invest in at least one small sand mixing unit of some type specifically for handling your facing sand. Such a unit would insure a uniform product whether synthetic or natural sand was employed since it would permit good blending of sand, binder, moisture and additives such as seacoal.

Smooth surfaces on castings are obtained through use of fine grain sand. However, the sand cannot be too fine since the lack of permeability will result in blows. Hence, the sand employed generally is a compromise—fine enough to provide a satisfactory surface, but possessing sufficient permeability to keep blows at a minimum. Without knowledge of the characteristics of your present sand, we can only suggest that you try using a finer grain sand for making your facing. Ask your sand supplier for small lots of finer grain sands which you can try out experimentally until you determine which is best for your purpose.

Finish Utensils with Abrasives

Q.—We are producers of gray iron castings, making cylinder heads, water-cooled manifolds and other such work using a typical analysis showing 2.40 per cent Si, 0.75 per cent Mn, 0.40 per cent max P, 0.10 per cent Cr, 0.25 per cent Cu and 3.40 per cent TC. We are considering the manufacture of some cast iron grills somewhat like a frying pan, only larger, and would like information on the following: How is the fine finish obtained on this cast iron kitchen ware? How does one obtain this dark finish on the castings? How does one "break-in" these grills; by break-in we refer to the claim made by most of the cast iron ware manufacturers to the effect that their pots are ready to use as is? Are any of these pots machined on the inside to obtain this finish?

A.—By fine finish on cast iron pots and pans, we assume that you are referring to the interior appearance. That is obtained by grinding and polishing —first with grinding wheels followed by operations with abrasive-impregnated fabric wheels known as set-up or polishing wheels. Exterior surfaces, except for the bottom, are not treated, and the smooth surface is due to use of fine-grain molding sands. Bottom is ground for flatness and polished.

So far as we know, the dark appearance of the exterior or skin is the natural appearance after removal from the sand—that is, it does not differ from any other gray iron casting. Possibly it might be a little darker gray due to the fact that thin section castings are made from higher silicon content metal, but the more rapid freezing rate should decrease the graphitization.

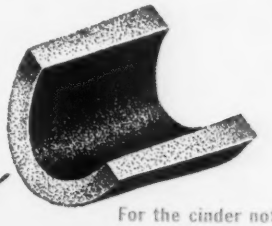
We believe that the reference to "break-in" means that the pots and pans only have to be washed before use, and the term goes back to the time when the protective coatings applied to prevent rusting of the ground and polished surfaces required considerable application of elbow grease in removal. In other words, the protective coatings now used are soluble in soap or other household detergent solutions.

No machining operations are employed in finishing interior surfaces. As previously mentioned, the finish is obtained by use of abrasive wheels—about 1/32 to 1/16-in. of metal being removed in that part of the finishing process.

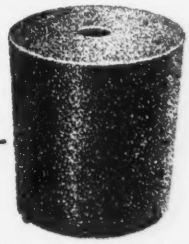
WHEREVER THE HOT STUFF HITS

USE NATIONAL CARBON

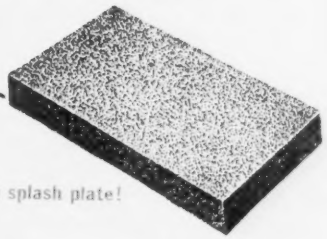
TRADE-MARK



For the cinder notch liner!

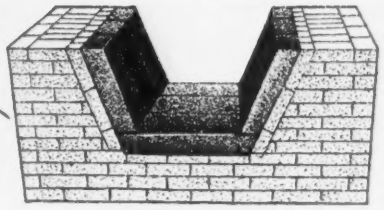


For the cinder notch plug!

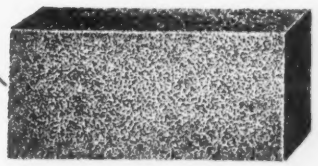


For the splash plate!

For the runout troughs!



For the skimmer plate!



● "National" carbon is now firmly established for blast furnace linings. It is being used outside the furnace as well—wherever there is contact with molten material—for the splash plate, runout troughs—clear down to the ladle—skimmer plate, cinder notch liner and cinder notch plug.

The reasons?

"National" carbon has no melting point. It is highly resistant to slag attack and thermal shock . . . not wet by molten metal . . . has a low thermal expansion . . . and maintains its mechanical strength at elevated temperatures.

Use "National" carbon inside and outside your blast furnaces and you cut down maintenance, speed up production and save money. For more information, write to National Carbon Company, Dept. F.

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A Division of Union Carbide and Carbon Corporation

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District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

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MEN
of Industry

WARDEN F. WILSON has been elected president, general manager and a director, Donegal Mfg. Corp., Marietta, Pa., producer of carbon steel, alloy steel and nonferrous castings. Mr. Wilson, following graduation from University of Illinois in 1925, joined the Indiana Harbor, Ind., works American Steel Foundries, as an apprentice, where he became assistant to the works manager and later manager of the Pittsburgh works. Since 1940 he has been general sales manager, Lebanon Steel Foundry, Lebanon, Pa. Active in steel casting industry affairs, Mr. Wilson is national chairman of the advertising and public relations committee, Steel Founders' Society of America, and was recently elected president of the Alloy Casting Institute.

♦ ♦ ♦

Jacob W. Zinss, formerly assistant vice president in charge of operations, the Duraloy Co., Scottdale, Pa., has been appointed general manager of operations. Mr. Zinss, whose family have been engaged in the foundry industry for four generations, has had 35 years of experience in high alloy, gray iron, steel and aluminum foundries.

♦ ♦ ♦

Hermann P. Good, formerly superintendent, has been named manager of the foundry division, Textile Machine Works, Reading, Pa. **John C. Bender** has succeeded Mr. Good as superintendent of the foundry division. Mr. Good joined the company in 1932, became production manager in 1935 and foundry superintendent in 1940. He served as president of the Reading Foundrymen's Association in 1941 and president of Gray Iron Founders' Society in 1949-50. Mr. Bender, with the company since 1918, spent the first 25 years as a metal patternmaker. In 1943 he became supervisor in the inspection department and two years later, general foreman in the foundry.

♦ ♦ ♦

D. B. DeJohn, formerly foundry superintendent, Illinois Foundry Co., Springfield, Ill., has been appointed superintendent of the gray iron division, Riverside Foundry Inc., Bettendorf, Iowa. A graduate of Eureka College and Bradley University, Mr. DeJohn for 13 years was foundry supervisor, Caterpillar Tractor Co., Peoria, Ill., and later was superintendent of the gray iron foundry, John Deere Dubuque Tractor Works, Dubuque, Iowa, subsidiary of Deere & Co., Moline, Ill.

♦ ♦ ♦

Edward J. Roesch has been appointed superintendent of the Meadow Lands, Pa., plant, Brake Shoe & Castings Division, American Brake Shoe Co., New York, succeeding **Thomas Baldwin,** who has retired but will serve temporarily as a consultant. Mr. Roesch joined the company's Buffalo plant in 1917 where he became superintendent in 1936. **Thomas P. Wallace,** formerly foundry foreman at the division's Norwood, Mass., plant, has been named to succeed Mr. Roesch as superintendent of the division's Buffalo plant. Mr. Wallace has been associated with the company since 1940.

♦ ♦ ♦

Fitz Coghlin Jr., formerly quality control manager, Albion Malleable Iron Co., Albion, Mich., has been appointed plant manager, Dock Foundry Co., Three Rivers, Mich. A graduate of University of Texas, Mr. Coghlin was metallurgist for Arcade Malleable Iron Co., Worcester, Mass., from 1941-1945, when he joined Albion Malleable Iron Co. as metallurgist.

♦ ♦ ♦

Andrew Kavosi has been appointed foundry superintendent and **Leslie Jones,** works manager, Auto Special-

(*Continued on page* 124)

WARDEN F. WILSON
. . . heads Donegal Mfg. Corp.

JACOB W. ZINSS
. . . gen. mgr., Duraloy Co.

HERMANN P. GOOD
. . . foundry division manager

JOHN C. BENDER
. . . foundry division supt.

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MEN *of Industry*

(*Continued from page* 122)

ties Mfg. Co. (Canada) Ltd., Windsor, Ont. Mr. Kavosi was coreroom foreman there for 13 years and assistant foundry superintendent for the last year. Mr. Jones has served in various capacities with the company for 20 years.

♦ ♦ ♦

Robert C. Becherer has been elected executive vice president, Link-Belt Co., with headquarters at the executive offices in Chicago. Mr. Becherer joined Link-Belt in 1923, following graduation from Purdue University. He has been general manager of the Ewart plant in Indianapolis since 1947 and a vice president since March. **Richard E. Whinrey,** assistant general manager at the Ewart plant, succeeds Mr. Becherer as general manager there. Mr. Whinrey was graduated from Purdue University in 1925, and was previously assistant general manager of the Dodge plant in Indianapolis.

♦ ♦ ♦

L. A. Rodelius has been named a vice president, the Gartland-Haswell Foundry Co., Sidney, O. Mr. Rodelius was formerly associated with the Dayton Malleable Iron Co., with which he served as superintendent of its Ironton, O., plant, general manager of the Dayton, O., plant and director of industrial relations.

♦ ♦ ♦

Capt. Richard H. Lambert, who recently was appointed shop superintendent, U. S. Navy Yard, Philadelphia, was formerly officer in charge of the Welding, Casting and Forging Branch and Metallurgical Branch, Bureau of Ships. Following graduation from Annapolis he took postgraduate courses at Carnegie Institute of Technology. From 1940-46 he was stationed at the U. S. Naval Gun Factory, Washington, in the Metallurgical and Testing Section, where he became officer in charge, and then was assigned to Bureau of Ships.

♦ ♦ ♦

William Croysdale, formerly assistant to the manager of the production department, Metal Products Division, Koppers Co., Baltimore, has been named manager of the division's Bartlett Hayward plant there, where he will be responsible for activities of the manufacturing departments, including the foundry. Mr. Croysdale, a graduate of Ohio State University, has had wide experience with engineering companies in this country and more recently in a consulting capacity with Ibcon Ltd., Bombay, India, and Tata Iron & Steel Co., Ltd., Jamshedpur, India.

♦ ♦ ♦

Dan Reebel, until recently associate editor of STEEL, Cleveland, has been appointed Pittsburgh resident editor of that publication and FOUNDRY, succeeding **William H. Humphries Jr.** who has resigned. Mr. Reebel, who joined the Cleveland office of Penton Publishing Co. in 1947, was previously associated with Mesta Machine Co. and Youngstown Sheet & Tube Co., in the Pittsburgh area.

♦ ♦ ♦

Fred R. Grassle has been appointed assistant to the president, Hills-McCanna Co., Chicago, maker of valves, pumps, lubricators and magnesium castings. Mr. Grassle will continue as secretary of the company. **R. T. Kidde** has been appointed general sales manager of all divisions.

♦ ♦ ♦

J. B. Laramy, for the last 6 years assistant manager of the Chicago district office, Worthington Pump & Machinery Corp., Harrison, N. J., has been appointed manager of the marketing research department. He joined the company following graduation from University of Michigan in 1929. **J. T. Carroll** has succeeded Mr. Laramy as assistant manager in Chicago. A graduate of Northeastern University, Mr. Carroll joined Worthington in 1931, and for the last 3 years has been regional distributor supervisor of the air conditioning and refrigeration division in Chicago.

♦ ♦ ♦

Eugene W. Smith has established an office at 5344 W. Adams St., Chicago 44, to operate as national distributor for South Dakota quartzite ganister and other foundry materials. For the past 5 years he has been associated with Western Materials Co., Chicago, the last 2½ years as vice president. Prior to that for 3½ years he was works manager, Lindahl Foundry Division, American Gear & Mfg. Co., Chicago, and from 1929 to 1943 was president-general manager of his own company, Eugene W. Smith Inc., Evansville, Ind., supplier of foundry sands.

♦ ♦ ♦

Harold E. Simmons has been appointed engineer in the Furnace Division, Reda Pump Co., Bartlesville, Okla. Mr. Simmons, a graduate of Massachusetts Institute of Technology, has been associated with the Electron Corp., Littleton, Colo. for two years. Previous connections include Warwick Malleable Co., Hillsgrove, R. I., and John Deere & Co., Moline, Ill.

♦ ♦ ♦

Jerry Reiling, formerly associated with W. S. Nott Co., Minneapolis, has been appointed district manager in the Philadelphia-Baltimore territory, for Hyster Co., Portland, Oreg.

(*Continued on page* 127)

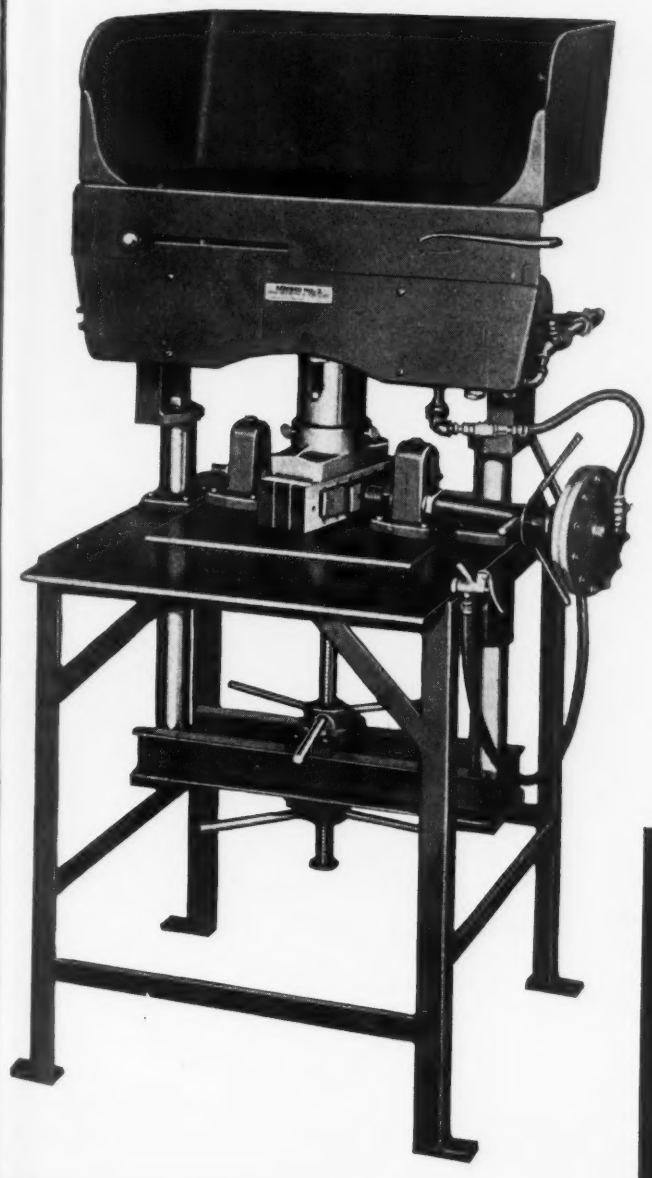
RICHARD E. WHINREY
. . . Ewart plant manager

ROBERT C. BECHERER
. . . exec. v. p., Link-Belt Co.

L. A. RODELIUS
. . . joins Gartland-Haswell

CAPT. RICHARD H. LAMBERT
. . . Navy Yard shop supt.

Redford CORE BLOWERS



REDFORD NO. 2 STATIONARY MAGAZINE TYPE CORE BLOWER . . . . .

New standards are being set with this machine, because every motion of your operator has been correctly evaluated to obtain a maximum of production with a minimum of effort.

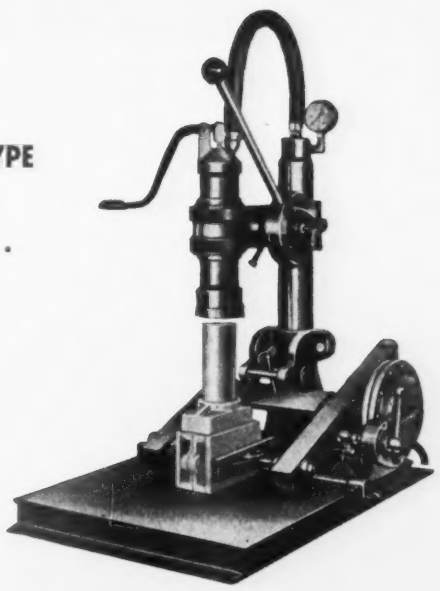
8 OUTSTANDING FEATURES:

1. Large stationary work area.
2. Large sand supply hopper.
3. Stationary sand magazine.
4. Easy accurate locating of core boxes.
5. Quick change magazine heads.
6. Quick adjustment for different height core boxes.
7. Quick change, fully adjustable, vertical clamping attachment.
8. Actuating one handle clamps the core box, blows the core and releases the core box, in two seconds.

CAPACITY: Cores up to 5#

Write for Specification Bulletin "F"

REDFORD CARTRIDGE TYPE BENCH CORE BLOWER . . . . .



The original small core blower . . Proven simplicity, speed and flexibility. Makes cores up to 2#.

Thousands in use in American Foundries . .

Write for Specification Bulletin "G"

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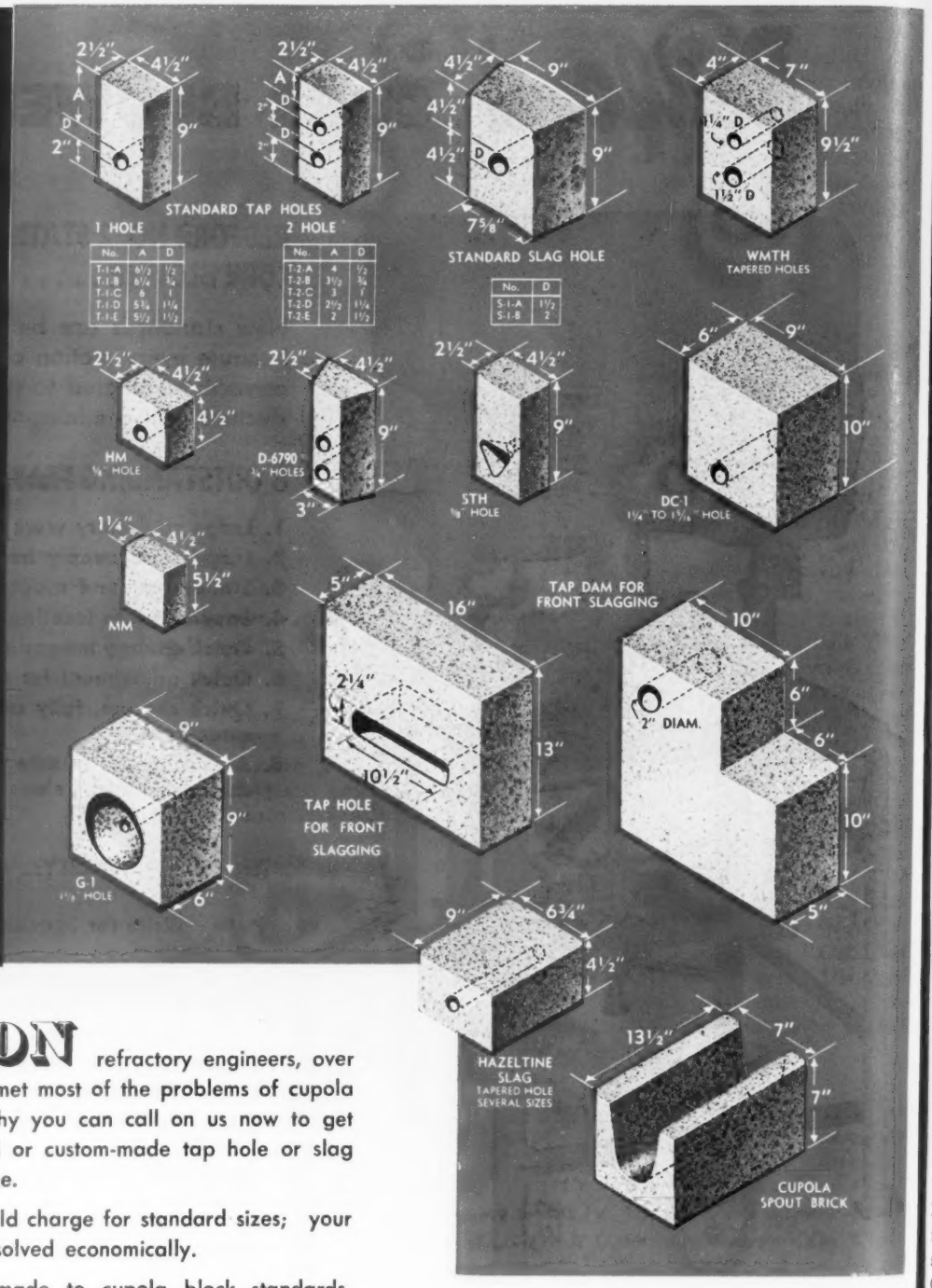
20733 GLENDALE AVENUE **DETROIT 23, MICHIGAN**

Run your foundry on a high production schedule with these quick-to-install cupola specialties



IRONTON refractory engineers, over the past 35 years, have met most of the problems of cupola maintenance. That is why you can call on us now to get delivery of any standard or custom-made tap hole or slag hole block on short notice.

We do not make any mold charge for standard sizes; your special problem can be solved economically.

Cupola specialties are made to cupola block standards, using Ironton's performance-proved mixture of Kentucky flint and semi-flint clays. Write for our Bulletin 101-N, or let our nearest representative know what you need. Phone the number listed at the right.

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CARO-LINE • NOJOINT • SPECIAL SHAPE REFRACTORIES
KENTUCKY CLAY FIRE BRICK PRODUCTS

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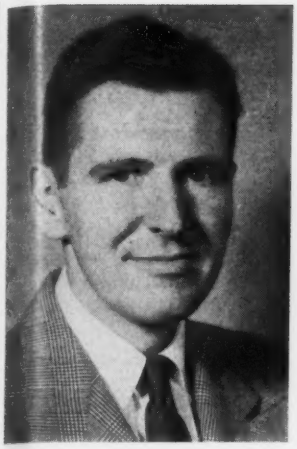
Buffalo, N. Y.	TAylor 2091
Charlotte, N. C.	55-285
Chattanooga, Tenn.	7-6697
Chicago, Illinois	HArrison 7-8708
Cleveland, Ohio	CHerry 1-0711
Cleveland, Ohio	VUlcan 3-8200
Detroit, Michigan	WOodward 3-8123
Hartford, Conn.	33-0941
Ironton, Ohio	109
Jacksonville, Florida	3-5586
Milwaukee, Wisconsin	DAly 8-4790
Philadelphia, Pa.	JEfferson 5-1012
St. Paul, Minn.	EMerson 6312
Seattle, Washington	MAin 4330
Silver Spring, Md.	JUniper 7-5468
Spokane, Washington	MAin 1644



JOHN C. EWER
. . . Norton executive, England

RUSSELL LINDERSMITH
. . . coke sales, S. California

HAROLD W. SCHWENGEL
. . . v. p., Modern Equipment

LLOYD R. JACKSON
. . . asst. dir., Battelle

(*Continued from page* 124)

Mr. Reiling, who previously was with U. S. Steel Supply Co., St. Paul, will work with Equipco Sales Co., McCall Boykin Co., Baltimore, Rapids Handling Equipment Co. and Richmond Auto Parts Inc., Philadelphia, distributors of Hyster Co.'s materials handling equipment in that area.

♦ ♦ ♦

John C. Ewer, for the last year assistant general manager, Norton Grinding Wheel Co. Ltd., Welwyn Garden City, Herts, England, has been appointed managing director there. Mr. Ewer joined the Abrasive Division of Norton Co., Worcester, Mass., in 1934, subsequently became New England field engineer in 1937, and until last year was abrasive engineer in the Boston district.

♦ ♦ ♦

Russell Lindersmith has joined the Los Angeles office of Wilson & Geo. Meyer & Co., San Francisco, distributors of coke produced by De Bardeleben Coal Corp., Birmingham. He will be in charge of coke sales in southern California. Mr. Lindersmith was formerly with Kaiser Steel Corp., Los Angeles, engaged in distribution of various products, principally pig iron.

♦ ♦ ♦

Harold W. Schwengel, formerly sales manager, Modern Equipment Co., Port Washington, Wis., has been named vice president in charge of sales. During the last 12 years Mr. Schwengel has served in production engineering, as sales engineer, chief designing engineer and as sales manager.

♦ ♦ ♦

Lloyd R. Jackson has been named an assistant director of Battelle Memorial Institute, Columbus, O., where he will handle research coordination. Mr. Jackson was graduated from University of Colorado and received his master's degree in physics from Yale University. Prior to joining the Battelle staff in 1935, he was a member of the research staff of Jones & Laughlin Steel Corp., Pittsburgh.

♦ ♦ ♦

Otto F. Bender has been appointed Philadelphia district sales manager, with headquarters at 1326 Western Saving Fund Bldg., to handle sale of chain, hoists and other material handling equipment in that area for Woodhouse Chain Works, Trenton, N. J., one of the Round Associate Chain Companies. Mr. Bender, who attended University of Pennsylvania and Drexel Institute of Technology, was formerly associated with Manning, Maxwell & Moore, Muskegon, Mich., as field engineer for its Crane & Hoist Division.

♦ ♦ ♦

F. H. Frey has been named manager of roll sales and **P. C. Haldeman,** general superintendent, Pittsburgh Rolls Division, Blaw-Knox Co., Pittsburgh. Mr. Frey, a graduate of Ohio State University, has been with the company 15 years, until recently as service engineer. Mr. Haldeman, a graduate of Pennsylvania State College, joined the company in 1943, and was first associated with the company's Lewis Foundry & Machine Division. Recently he has been assistant general superintendent of Pittsburgh Rolls Division.

♦ ♦ ♦

Eads Johnson Jr. has been appointed executive vice president, Southern Wheel Division, American Brake Shoe Co., New York. Following graduation from Yale University in 1934, Mr. Johnson joined the company and entered sales work for the Brake Shoe & Castings Division in 1935. In 1949 he was transferred to the sales department of Southern Wheel Division, where until recently he was assistant vice president.

♦ ♦ ♦

Harris C. Miller has been appointed sales representative in upper New York and western Pennsylvania for Hooker Electrochemical Co., with headquarters in the company's sales offices in Niagara Falls, N. Y. Mr. Miller was graduated from Worcester Institute of Technology and joined the company in 1941. He has been in sales work since 1949.

♦ ♦ ♦

Russell P. Sherrill has been named New England district sales manager, the Bridgeport Chain & Mfg. Co., Bridgeport, Conn., one of the Round Chain companies. Mr. Sherrill attended Williams College and was formerly New England district sales representative for the hoist division of Yale & Towne Mfg. Co., Philadelphia.

♦ ♦ ♦

Frank W. Wabiszewski, vice president, Maynard Electric Steel Castings Co., Milwaukee, was recently presented a civic service award by the Fraternal Order of Eagles there, for his outstanding activities in promotion of charity drives in Milwaukee.

♦ ♦ ♦

Frederick L. Murray, since 1943 foreman of iron, steel and large core molding for Hunt-Spiller Mfg. Corp., Boston, has been advanced to assistant superintendent of foundries. Mr. Murray, who joined Hunt-Spiller in 1919 as a carpenter's helper, succeeds **William E. Mulcahy,** recently named superintendent of foundries.

♦ ♦ ♦

Dr. Max Hansen, recently appointed chairman of the metals research department, Armour Research Foundation, Illinois Institute of Technology, Chicago, has been named chairman of

MEN *of Industry*

the department, succeeding **Dr. Carl Swartz,** who has become metallurgical consultant. **Robert A. Lubker** has been named associate chairman of the metals department.

♦ ♦ ♦

Sven Vaule has resumed practice as a consulting management engineer, with headquarters at 1 Mitchell Road, South Portland, Me. Mr. Vaule was graduated from University of Minnesota and has been consultant to many manufacturers in installation of improved controls. In 1949, to facilitate adoption of a recommended modernization program, he became works manager at the Saco-Lowell Shops, Biddeford, Me., which he will still serve in a consulting capacity.

♦ ♦ ♦

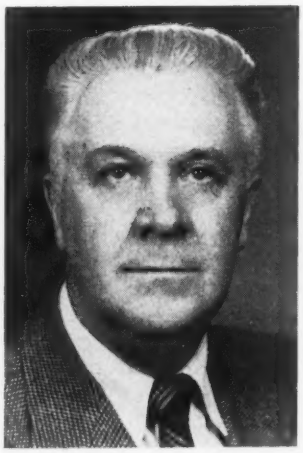
Norman E. Craig and **John H. Tressler** have been elected members of the board of directors, Hickman, Williams & Co. Mr. Craig, since 1928 resident manager of the company's New York office, joined the company in 1917. For several years he has also had charge of the import and export division. Mr. Tressler, resident manager of the Cleveland office, was appointed salesman in the Cincinnati office in 1919. He has been in the Cleveland office since 1929.

♦ ♦ ♦

W. C. Landis, vice president, Westinghouse Air Brake Co., has been appointed general manager of the Air Brake Division, responsible for operations of division plants at Wilmerding, Pa., and Emeryville, Calif. Mr. Landis, who joined the company in 1915, has served as plant superintendent, works manager and vice president in charge of manufacturing operations and industrial relations at all company plants. **A. M. Wiggins,** vice president, has been appointed general manager of the Union Switch & Signal Division of Westinghouse Air Brake Co., in charge of operations at the Swissvale, Pa., plant. Mr. Wiggins, who joined the company in 1933, recently has been in charge of planning and development of new activities and of the company's foreign subsidiaries.

♦ ♦ ♦

Curt C. Drake, who has been elected chairman of the Timberline Chapter of the American Foundrymen's Society for 1951-52, has been superintendent of the Denver plant of the Griffin Wheel Co., since 1939. Mr. Drake, a native of Breckenridge, Colo., attended public schools there and has supplemented his education by extension courses in later years. He worked in a number of mining towns of Colorado and Nevada, and as laboratory assistant for a Denver drug company until 1916 when he became storekeeper of the Griffin Wheel Co. in Denver. Following five years of clerical work in the office there he was transferred for a short time to the Los Angeles plant, and later became office manager in Denver.



CURT C. DRAKE

♦ ♦ ♦

Walter W. Urmetz Jr. has been appointed a sales representative in the Cleveland district office of the general machinery division, Allis-Chalmers Mfg. Co., Milwaukee. Mr. Urmetz was graduated from University of Detroit two years ago and has completed the company's graduate training course.

♦ ♦ ♦

Lierd E. Grant has been appointed manager of the Los Angeles branch office, the Howe Scale Co., Rutland, Vt., maker of scales and hand trucks. Mr. Grant will continue as manager of the San Francisco branch where **William J. Tucey** has been appointed assistant branch manager. **O. B. Collins,** formerly in the Houston, Tex., office, has been assigned to the Atlanta office. **Jack H. Brewer,** previously in the company's other midwest branches, has been appointed manager in Minneapolis.

♦ ♦ ♦

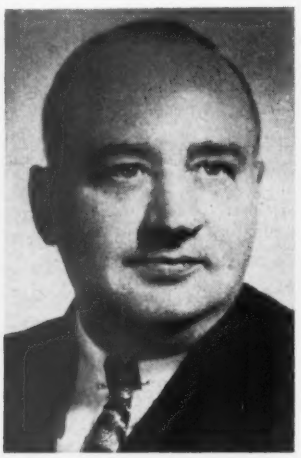
William V. Shakespeare has been appointed sales manager and director of the export sales division, Independent Pneumatic Tool Co., Aurora, Ill., with headquarters in New York. Since 1936 Mr. Shakespeare has been a field engineer in the export division, which he joined following graduation from the University of Notre Dame.

♦ ♦ ♦

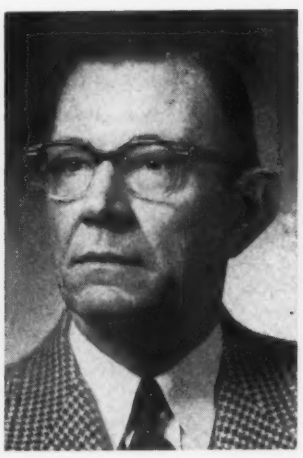
Louis Lippa, formerly vice president, has been named vice chairman and treasurer, Apex Smelting Co., Chicago, succeeding **George Starmann Sr.,** who has retired. **Robert K. Beck** and **Fritz Nussbaum,** vice presidents, have been appointed general manager of operations and manager of raw material purchases, respectively, and **A. J. Peterson** has been made vice

(*Concluded on page* 130)

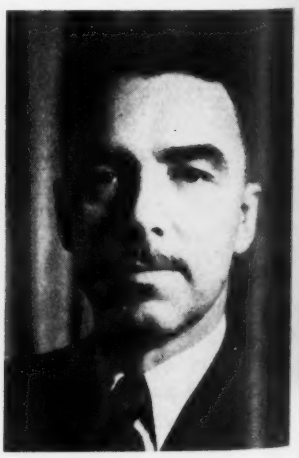
SVEN VAULE
. . . engineering consultant



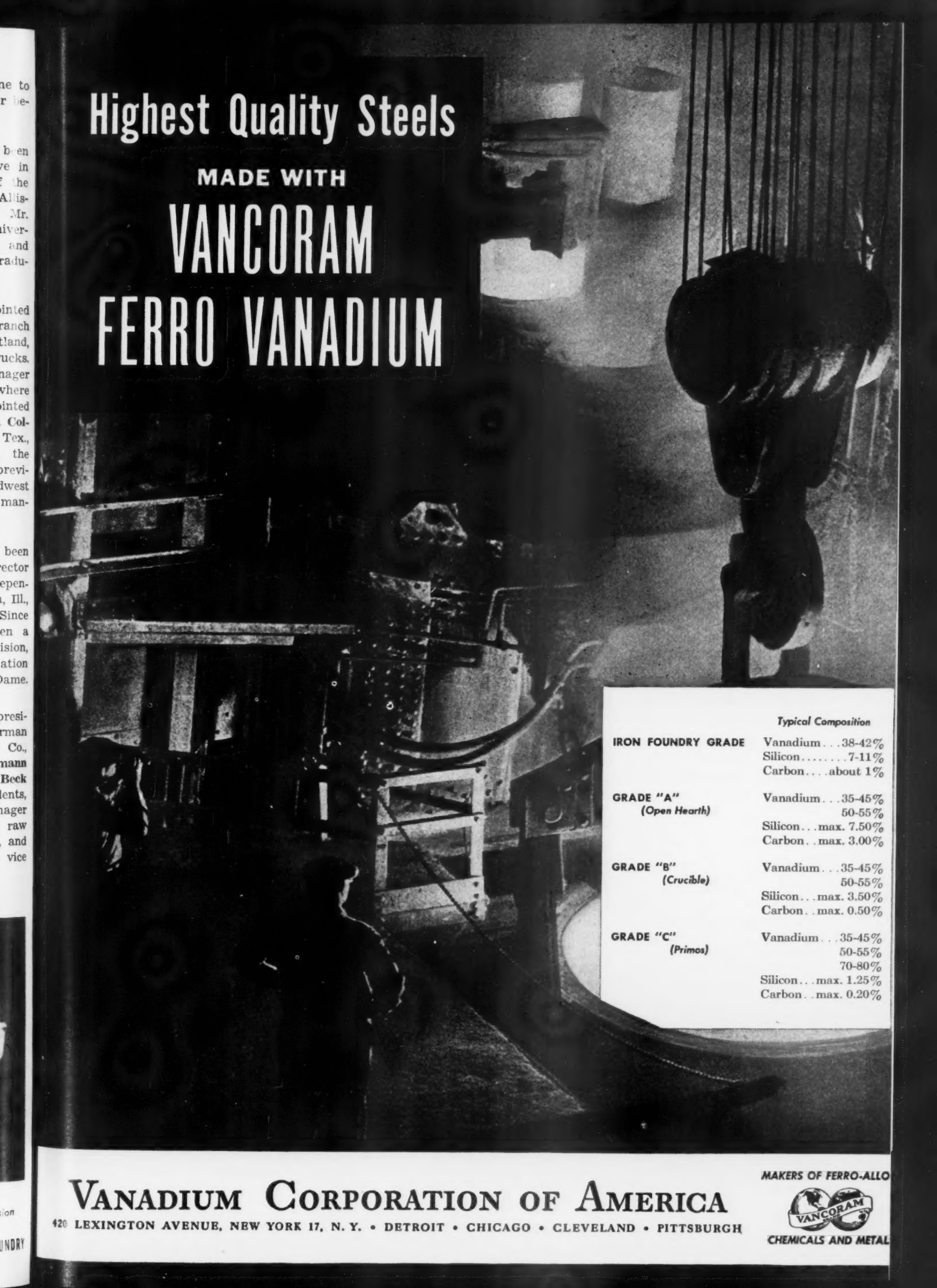
NORMAN E. CRAIG
. . . director, Hickman, Williams



JOHN H. TRESSLER
. . . director, Hickman, Williams



W. C. LANDIS
. . . mgr., Air Brake Division



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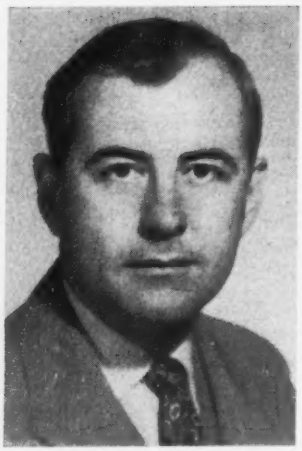
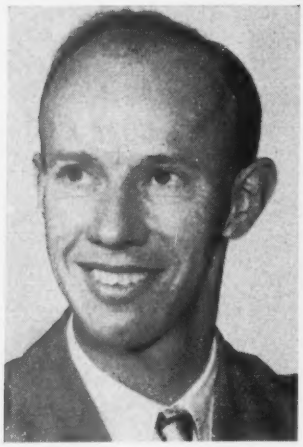


HOWARD E. VOIT
. . . branch mgr., Sterling



JAMES S. CAMPBELL JR.
. . . foundry courses, U. of C.

R. H. WILLIAMS
. . . heads Ontario Chapter

DR. FRANKLIN B. ROTE
. . . joins Albion Malleable

(*Concluded from page* 128)
president in charge of sales and advertising.

♦ ♦ ♦

Howard E. Voit has been named branch manager of the eastern office, Sterling Wheelbarrow Co., Milwaukee, which was recently moved from New York to 389 Main St., Hackensack, N. J. Mr. Voit, a graduate of University of Wisconsin, joined the Milwaukee sales department of the company in 1946, following release from Navy service. Later that year he was transferred to the New York office where he became branch manager succeeding **George H. Lambkin** who retired after 30 years as branch manager there. Mr. Voit is a director of the Metropolitan Chapter of the AFS.

♦ ♦ ♦

James S. Campbell Jr. has been appointed assistant professor of mechanical engineering, University of California, where he will organize courses in foundry practice and establish an educational and research foundry. Mr. Campbell was graduated from Georgia School of Technology in 1934, when he joined International Business Machines Corp., Endicott, N. Y. Following military service he became an instructor at Rensselaer Polytechnic Institute and while completing graduate work there developed a foundry laboratory and developed material for a textbook entitled *Casting and Forming Processes in Manufacturing.* He received his master's degree in mechanical engineering at Rensselaer Polytechnic Institute in June.

♦ ♦ ♦

R. H. Williams, recently elected chairman of the Ontario Chapter of the American Foundrymen's Society for 1951-52, is general manager, Air Brake Division, Canadian Westinghouse Co. Ltd., Hamilton, Ont. Mr. Williams was graduated from McMaster University, Hamilton, Ont., and worked for a year with a firm of consulting metallurgists. In 1938 he became associated with Steel Co. of Canada, Hamilton, Ont., as a metallurgist, remaining there until 1945 when he joined Canadian Westinghouse Co. as superintendent of foundries. Recently he became general manager of the Air Brake Division in charge of sales, engineering and manufacturing. Mr. Williams who has been active in Ontario Chapter activities, was chairman of the All Canadian Foundry Conference last year while serving as chapter vice chairman.

♦ ♦ ♦

Dr. Franklin B. Rote, for the last 5 years associate professor of metal processing and metallurgical engineering, University of Michigan, has been appointed manufacturing control manager, Albion Malleable Iron Co., Albion, Mich. Dr. Rote was graduated from University of Michigan in 1939 and received his Ph D degree there in 1944. Previous connections include International Nickel Co., Bayonne, N. J., and Wyman-Gordon Co., Worcester, Mass.

♦ ♦ ♦

Robert S. Bubb has been appointed marketing engineer, American Brake Shoe Co., New York. A graduate of Yale University, Mr. Bubb was recently a management engineer with Robert Heller & Associates, Cleveland.

♦ ♦ ♦

Hans J. Heine has been appointed chief metallurgist, Barberton Division of Rockwell Mfg. Co., Barberton, O. Mr. Heine was graduated from Institute of Technology, Berlin, and later did postgraduate work at Carnegie Institute of Technology. Prior to joining Rockwell Mfg. Co. as a metallurgist in 1946, he was associated with Aluminum Co. of America, New Kensington, Pa.

♦ ♦ ♦

Thomas Mathews has been appointed sales engineer in the Detroit office of J. O. Ross Engineering Corp., New York. Mr. Mathews was formerly engaged in industrial processing, high temperature work and rubber research.

♦ ♦ ♦

M. W. Barlow has been appointed manager of the ferroalloy division recently established by Foundry Services Ltd., Birmingham, England. Mr. Barlow was formerly sales manager of British Electro Metallurgical Co. Ltd., Sheffield. He is a member of the British Institute of Metals and the British Iron and Steel Institute.

♦ ♦ ♦

John F. Spaulding has been appointed sales manager, the Black & Decker Mfg. Co., Towson, Md., succeeding **Glen H. Treslar,** who recently became vice president in charge of sales. Mr. Spaulding joined the company in 1926 and has been manager of the Buffalo branch since 1931.

♦ ♦ ♦

Samuel O. Sorensen, since 1947 vice president in charge of research, Archer-Daniels-Midland Co., Minneapolis, has been named a director.

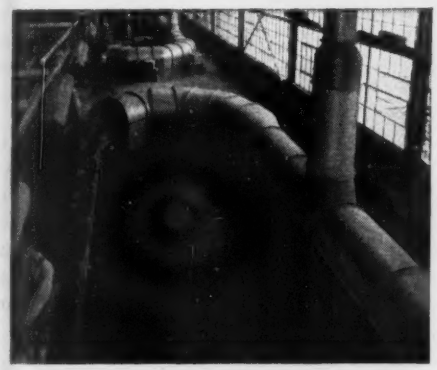
♦ ♦ ♦

Charles E. Wilson has retired as sales vice president, Worthington Pump & Machinery Corp., Harrison, N. J. He will continue as a consultant on sales problems in the Los Angeles, San Francisco, Seattle and Salt Lake City, Utah, offices. Mr. Wilson, who joined the company in 1892, was sales manager in Chicago and Los Angeles, more recently in the New York and Harrison, N. J., offices.

♦ ♦ ♦

Branford P. Hoffman has been appointed purchasing supervisor at the Experimental Station, Hercules Powder Co., Wilmington, Del.

Above: **Bartlett-Snow "Dust-Sucker" Side-Wall Hoods at Pouring Station of Large Production Foundry.**



Smoke Hoods Over Mold Conveyors Prevent Contamination of the Air, and Cool the Castings.

Bartlett-Snow "Dust-Sucker" Side-Wall Hood at Shakeout Handling Large, Heavy, Dry Flasks.

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DEFENSE PRODUCTION EMPHASIZED

At Steel Founders' Society Meeting

EMPHASIS on the steel casting industry's high level of production to help meet expanding requirements of the defense program featured sessions of the 49th annual fall meeting of Steel Founders' Society of America.

With prime interest focusing on the industry's rapid approach to an all-time peak in production, along with detailed discussions of the society's intensive research program, materials problems, regulatory requirements, and general industry outlook, the two-day meetings held at the Homestead, Hot Springs, Va., Sept. 24-25, attracted a record gathering of top management of steel foundries throughout the country. Registrations totaled 304, according to F. Kermit Donaldson, executive vice president, surpassing the previous high attendance mark established in 1950.

Production At High Rate

Despite manpower shortages and difficulties in securing adequate supplies of scrap and other raw materials, Mr. Donaldson reported, the steel castings industry now is producing at a rate approaching the all-time high of 1944, during World War II, when the industry shipped 2,445,421 tons. Currently, the country's 250 steel foundries are producing at a rate in excess of 2,200,000 tons yearly, according to official Bureau of the Census figures. This is more than 50 per cent ahead of 1950 total shipments of 1,461,667 tons.

Since steel castings are classified as a controlled material under the government's Controlled Materials Plan, Mr. Donaldson explained, practically all of the industry's production is being diverted to fulfillment of direct military and defense supporting requirements. Basic steel plant expansion is accounting for a substantial volume of castings orders, and the railroad freight car and other rail equipment building programs similarly are requiring heavy steel castings tonnage.

Shortages of alloying elements, among other vital materials, continue serious obstacles for the industry in meeting defense demands. Production of cast armor for tanks, for example, requires substantial quantities of alloys to meet rigid military specifications; and the highest grades of steel scrap, presently in seriously short supply, are essential for proper manufacture of cast armor. Meantime, Mr. Donaldson said, great ingenuity is being applied by steel foundry managements, metallurgists and operating executives in adapting the available materials and alloys to current production.

As a corrollary, bottlenecks exist in availability of heat treating facilities, laboratory testing equipment, and certain cleaning room equipment, but there is every reason to expect that production will be increased even above the present high level as equipment becomes available to eliminate these bottlenecks.

Additional emphasis on materials and equipment problems and the need for a concerted effort to assure success of the national scrap drive was pointed up by the society's president, Thomas H. Shartle, president, Texas Electric Steel Casting Co., Houston, Tex.

In his remarks opening the two-day sessions, President Shartle put particular stress on the scope and importance of results arising out of the society's extensive research activities and devoted much of his address to a detailed report on specific undertakings and plans for future expansion in this field.

With eight projects currently under way, covering fundamental research objectives of prime importance to steel foundries everywhere, Mr. Shartle reported, the society's present program contemplates the outlay of more than $100,000 over the next three-year period, not including additional practical projects now seriously under consideration.

Pointing out that research appropriations approved by the present board of directors represent the heaviest outlay in the society's history, he urged all member companies to make fullest use of the valuable technological resources being made available to all. "I can assure you," he said, "that if you look to and use these practical tools of production which society research has provided and is continuing to provide, you will find practical ways and means to lower costs, further improve cast steel products, and increase profits."

In addition, Mr. Shartle recommended that the industry create a new fund of $150,000 to finance a proposed five-year exhaustive study of hot tears in steel castings. The suggested project, he made clear, was being urgently advocated by him purely on a personal basis, and momentarily represented only his own hearty recommendation for future consideration and action on an industry basis, contemplating additional expenditures over and above the existing $100,000 program already projected.

Speaking in his capacity as military director of requirements, Maj. General Francis H. Griswold, Munitions Board, Washington, presented an outline of the responsibilities, aims, organization and practical workings of the Munitions Board. Dispelling some possible misunderstandings about the board, he explained that the terms "board" and "staff" commonly are used interchangeably, although the board, per se, consists of the chairman, John Small, three vice chairmen and their executive aides and consultants. The staff, he said, totals about 800 persons, of whom about 100 are military officers and personnel, some 300 civilians classified as catalogers, and the remainder fulfilling various clerical and office responsibilities.

Describes Board Activities

The board's basic job is simply that of "seeing that the services get what they need when needed to carry out their requirements." And one big aspect of that job, he added, is to analyze and "ride herd" on the services' buying and ordering requirements to assure that these commitments are adequate, but not excessive. As a corollary, a prime responsibility is that of planning and checking, in conjunction with the National Security Resources Board, what materials are needed, when they are needed, and where they are to be obtained.

The general also outlined the status and some specifics of the national stock-piling program for strategic materials, explained the tasks of the cataloging personnel of the board, the board's attitude toward the handling of "small business' participation in the national defense mobilization program, and the relationship of military and civilian requirements in a considered "guns and butter" economy.

George Dreher, executive director, Foundry Educational Foundation, followed with an enlightening outline

(*Continued on page* 136)

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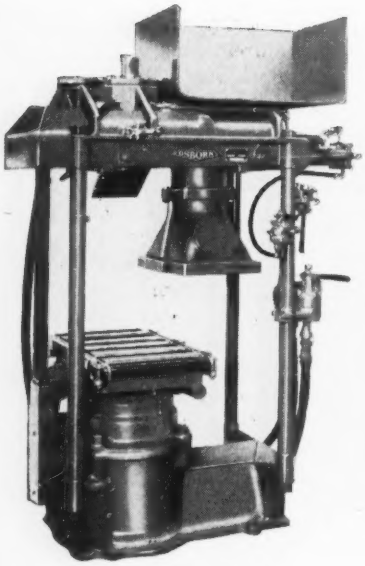
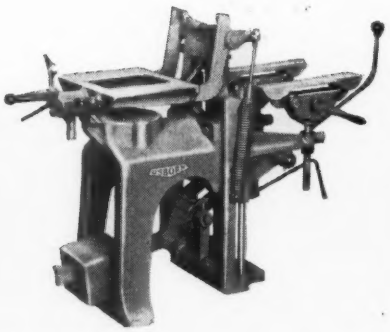
• CORE BLOWERS
Manual or Automatic Controls

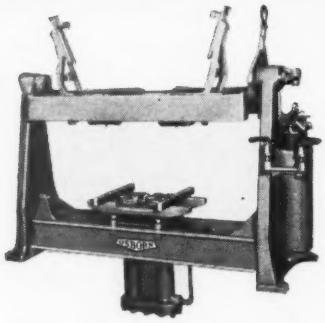


Draw Piston Type

Diaphragm Type

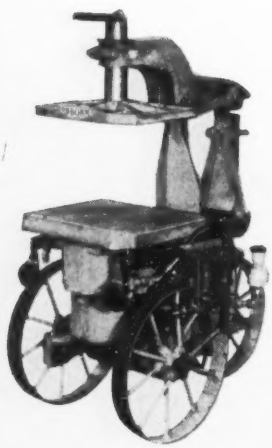


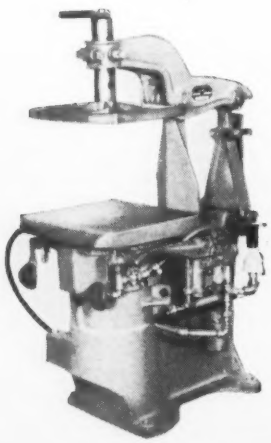
Hand Operated Rockover Core Machine

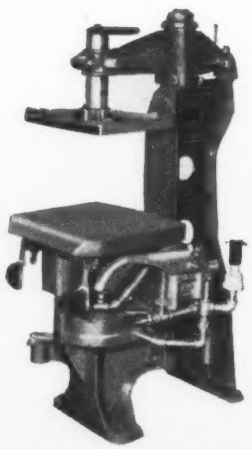


Core Box Rollover Drawing Machine

• SQUEEZERS
Portable or Stationary—Cantilever or Post Type







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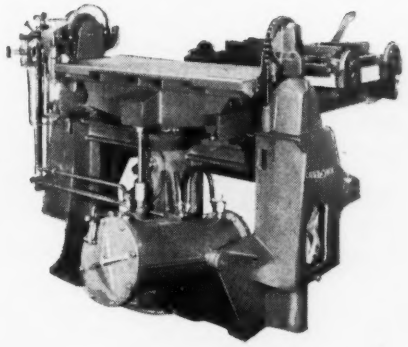
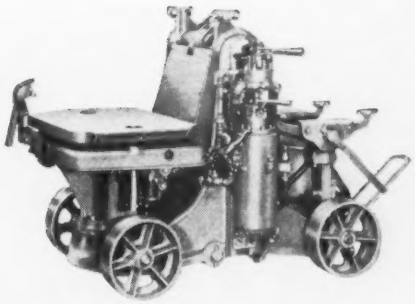
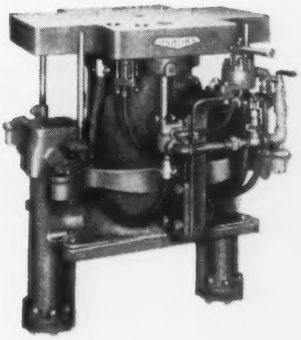
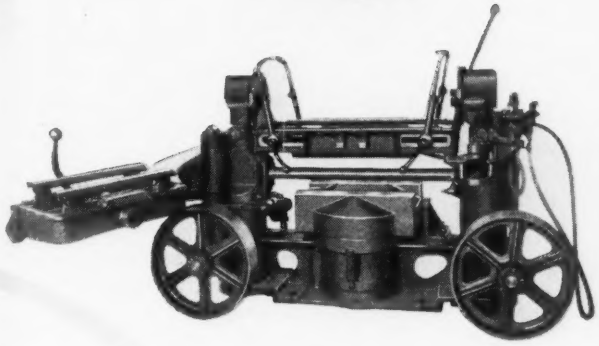
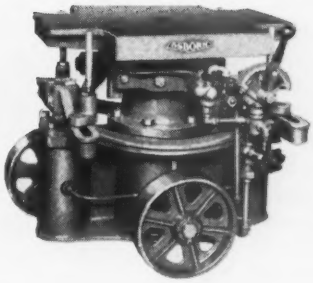
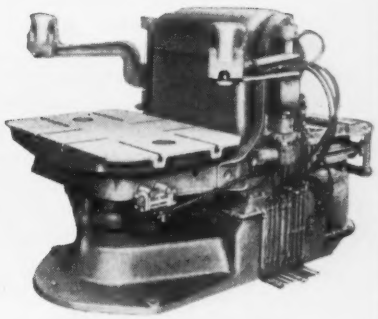


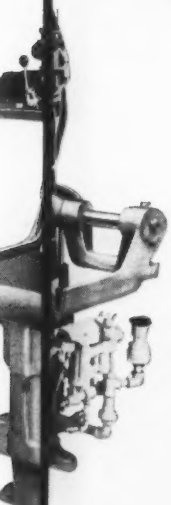




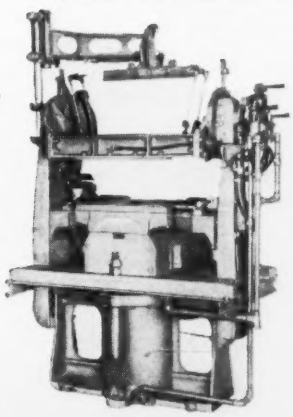


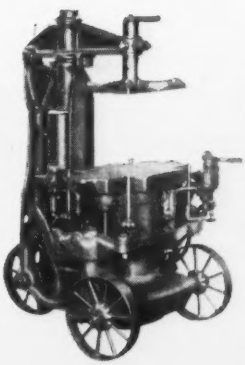


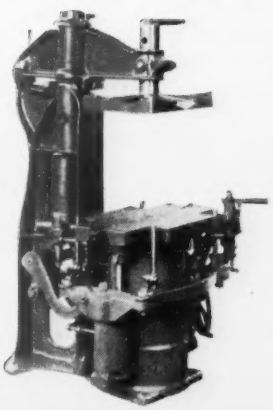


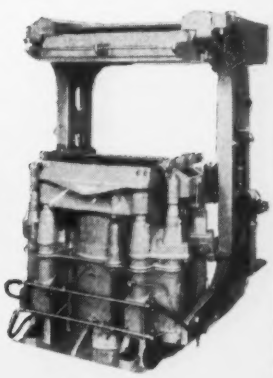


JOLT ROLLOVER SQUEEZE JOLT SQUEEZE STRIPPERS









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(*Continued from page* 133)

of the objectives and functioning of FEF in the nation's engineering colleges. Explaining that the program represented an invaluable adjunct beyond the normal educational and informational activities of the established industry technical and engineering societies, Mr. Dreher presented a thoroughly documented report indicative of FEF's greatly expanded activities and the measure of its growing influence and practical accomplishment.

Now actually operating in 14 leading engineering colleges, he reported, FEF maintains contact with 40 such schools and plans soon to be reaching 70 of them. Industry to date has spent $200,000-plus, and the schools now are spending at the rate of about $910,000 per year, in terms of college and university foundry laboratory facilities, he said. The 14 engineering colleges now have laboratories worth approximately $3,000,000 and there has been a concomitant expansion of foundry courses.

More Foundry Courses

Whereas in 1947 foundry engineering courses were available in only 14 colleges, Mr. Dreher pointed out 66 colleges and universities in 1951 were awarding undergraduate degrees based on foundry engineering majors, 11 colleges were awarding master's degrees, and ten had courses leading to doctorates.

At the same time, he said, there has been comparable growth in the numbers of qualified instructors and professors, and enhanced benefits and opportunities for students. In the past four years, 992 summer jobs have been provided for students, 674 engineering graduates have been absorbed directly in industry jobs, with 275 companies responsible for such placements—all adding up to "better manpower, better customer services, better use and utilization of materials, and the replacement of craftsmanship by engineering and other tangible advantages," according to Mr. Dreher.

A. J. McDonald, chief, Casting Section, Iron and Steel Division, NPA, outlined a number of the problems facing the ferrous foundry industry in regard to raw materials. He stated that, according to Marvin S. Plant, chief of the Scrap Section, NPA, the iron and steel industry will consume approximately 36 million tons of scrap in 1951, an increase of approximately 20 per cent over 1950. Outlook for obtaining that volume of scrap is not too good unless the present scrap drive is more successful in bringing out a larger tonnage of dormant and obsolete scrap. Outlook for importing scrap from European countries is dim and the supplies in the Pacific are problematic. The NPA is unable to allow users to accumulate inventory, and unless there is a marked increase in scrap volume, it will be practically impossible to reach projected production goals during the winter when inventories drop rapidly and scrap preparation is impossible in many parts of the country. Mr. McDonald advised each plant to start now to dig out unused and obsolete scrap.

In discussing the pig iron situation, Mr. McDonald presented information supplied by John A. Claussen, chief, Pig Iron Section, NPA. Full utilization of existing facilities has resulted in an increase in rated capacity for producing pig iron from 66.3 million tons in 1948 to 71.4 million tons as of Jan. 1, 1951, an improvement of 5.1 million tons. Blast furnace expansion now under way will add another 10 million tons by 1953, or an increase of 15 per cent over Jan. 1, 1950. Production of pig iron the first seven months of 1951 was about 4.1 million tons greater than for the same period of 1950. Notwithstanding improvements in the general overall situation, pig iron supply barely keeps up with demand and therefore, while it is not a controlled material, it is subject to the general iron and steel order M-1.

Steel Armor Problem

Problems in procurement of cast steel armor are due in some measure to the excellent record made by that product in World War II, according to Mr. McDonald. With the lessons of adaptability and usefulness of cast armor still fresh in the minds of the military, designers did the natural thing by expanding the use of cast armor on all new vehicles in the belief that an experienced industry could be depended upon to produce the required tonnage. Now these same designers are designing away from cast armor toward greater use of other types of fabrication, simply because the industry has been unable to date to provide the required tonnage.

Steps to curtail production of various products which utilize steel castings in volume should indicate the trend, and there can be no doubt that more drastic cuts are contemp'ated and that these will go on until there is room for production of cast armor, according to Mr. McDonald. With facilities gradually shaping up for production of heavy armor, even though additional capacity is required, the big squeeze is going to be for castings from a few pounds to 1500 lb each in weight. Mr. McDonald pointed out that the Tank-Automotive Center, 1501 Beard Street, Detroit, is headquarters for information and guidance on tank builders' requirements, and the casting section of NPA will work closely with the military in assisting on contracts for such armor.

E. J. Metzger, chief, Castings Section, Metal Branch, Office of Price Stabilization, Washington, discussed the price order CPR-60 and the possibility of clarifying some of the sections of that order.

An excellent film, "Steel of a Thousand Qualities," produced in Technicolor for Lebanon Steel Foundry, Lebanon, Pa., was shown to the society Tuesday morning. The world premier showing of this film was introduced by William H. Worrilow Jr. of the Lebanon organization.

CMP Was Oversold

Hardy M. Ray, Priorities Division, NPA, discussed "CMP and the Steel Castings Industry." Mr. Ray believes that CMP is here to stay as long as we have an emergency, that it is the only method available for adequately allocating materials. In his opinion much of the publicity accompanying allocations for the fourth quarter has exaggerated the tightness of the situation. However, CMP was oversold in the beginning and the problems now being experienced were expected and could not have been avoided.

Speaking on "What's Ahead for the Steel Castings Industry," Allen M. Schlichter, president, Pelton Steel Casting Co., Milwaukee, indicated the proper answer would be "Plenty." As an indication that our economy is dynamic, with a growth history which has always been underestimated, he pointed to the likely growth of work force during the next few years, to the increase in ouput per man-hour, and to the increased demand for goods.

Mr. Schlichter stressed the great contribution to the industry of the Product Development Committee of the society, which, he stated, has resulted in a great awakening in the steel castings industry. With what is now known about the tremendous undeveloped potential for cast steel products, the industry should be able to face the future with complete confidence in its ability to seek out and provide great quantities of additional tonnage, even under conditions as they existed when the going was rather rough. Adding the potentials provided by future growth of the country to the business which has

(*Concluded on page* 139)

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At a minimum of time, effort and expense—you can investigate the Shell Molding Process in your own plant, with Monsanto's help. We'll make shell molds from your pattern—by means of this revolutionary process—and send them to you *to make experimental castings,* using your conventional casting equipment.

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See for yourself how the Shell Molding Process helps you speed production, get better metal yields, and produce castings with a superior finish—plus other advantages.

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MONSANTO CHEMICALS AND PLASTICS

SERVING INDUSTRY ...WHICH SERVES MANKIND

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Plastics Division, Room 5706, Springfield 2, Mass.

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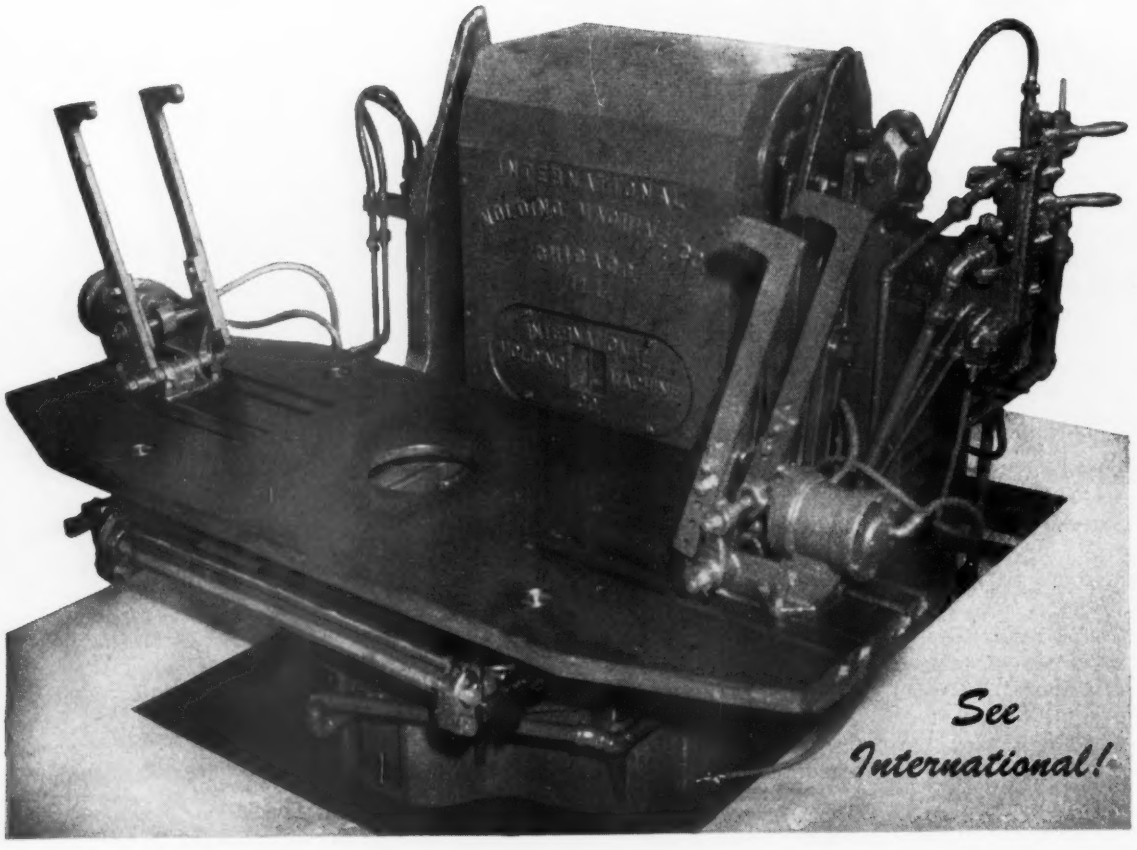


INTERNATIONALS are made in 90 Standard Types and 1400 Different Sizes. Special Designs to meet your special requirements may be developed for you. Foundries maintaining High Production are equipped with INTERNATIONALS. "There's a type for Every Job."

INTERNATIONAL FOUNDRY ENGINEERS, trained with practical experience of the working needs in the modern foundry, are ready to consult with you about your particular mechanical problems.

INTERNATIONAL MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS • (Suburb of Chicago)

(*Concluded from page* 136)

been missed, simply because the industry has not fully exploited its opportunities, provides convincing evidence of why the steel foundry industry is facing such an increased demand that only a policy of growth and expansion will be successful in acquiring and retaining all the tonnage that should rightfully be made in steel castings.

Announcement of the winners of the annual safety contest of the society was made by President Shartle, assisted by Technical and Research Director Briggs. The following were awarded plaques in the 1951 contest:

Group No. 1, 1000-15,000 man-hours exposure: Eastern Malleable Iron Co., Wilmington, Del.; Hughes Tool Co., Houston, Tex.; Malcolm Foundry Co. Inc., Newark, N. J.; Quincy Steel Casting Co. Inc., North Quincy, Mass.; Tonawanda Electric Steel Casting Corp., North Tonawanda, N. Y.; Weatherly Steel Castings Co., Weatherly, Pa.

Group. No. 2, 16,000-35,000 man-hours exposure: Deemer Steel Casting Co., New Castle, Del.; Walworth Co., Greensburg, Pa.

Group No. 3, 36,000-65,000 man-hours exposure: Bethlehem Steel Co., Steelton, Pa.; Hanford Foundry Co., San Bernardino, Calif.

Group No. 4, 66,000 man-hours exposure and up: Pittsburgh Steel Foundry Corp., Glassport, Pa.

Award Safety Certificates

The following were awarded certificates: Bethlehem Steel Co., Bethlehem, Pa., frequency rate 6.1; Chapman Valve Mfg. Co., Indian Orchard, Mass., frequency rate 7.2; Continental Foundry & Machine Co., Wheeling W. Va., frequency rate 8.1; Crane Co., Chicago Works Plant, Chicago, 5.1; Crucible Steel Casting Co., Cleveland, 6.4; Dayton Steel Foundry Co., Dayton, O., 3.6; Duriron Co. Inc., Dayton, 8.9; General Steel Castings Corp., Eddystone, Pa., 5.0; General Steel Castings Corp., Granite City, Ill., 9.7; Mackintosh-Hemphill Co., Midland, Pa., 5.5; Massillon Steel Casting Co., Massillon, O., 4.8; Symington-Gould Corp., Depew, N. Y., 5.1.

It was pointed out that the Hughes Tool Co., Houston, Tex., has not had a lost-time accident for three years, nine months.

The cumulative lost-time injury frequency rating of the industry for the contest period in 1949 was 19.1 and for 1950 was 20.2, compared with a rating of 28.4 for 1951 to date. The cumulative frequency rate for the industry for the first seven months of 1951 is 28.5 compared with 18.8 in 1950, indicating a decrease in foundry safety.

FOUNDRY EDUCATIONAL FOUNDATION

Adopts Annual Membership Plan

By GEORGE K. DREHER
Executive Director
Foundry Educational Foundation

AS A PART of future plans of the Foundry Educational Foundation, its trustees have activated an annual contributing membership plan. It is hoped that this plan will place the foundation on a permanent financial basis and avoid periodic fund drives within the industry. The fund drives were necessary to get the movement under way and as a means of determining whether or not the foundation idea had merit before attempting a permanent structure.

The permanent foundation will seek to capitalize on its present position which includes a high level of interest among engineering colleges, the growing interest of student engineers and an excellent number of foundry courses which are more than adequate to initiate young men into the problems of the foundry industry and possible applications of their engineering talent to its development and growth.

Further opportunities will revolve around the scientific and technical surge now developing within the foundry industry; to promote the interest of students in the face of a serious drop in student population; to foster recruiting and training of these young men by our industry; to increase the activity and service of the Industry Advisory Committees to the universities; to urge development of technical data for use by all engineering students so as to permit proper consideration of castings as an engineering material, and to stimulate the interest of all engineering schools—even though this be on an indirect basis—as to the values and possibilities of cast metals as an engineering material.

The trustees are well aware that the most successful financing of the Foundation so far was the voluntary effort which launched the Foundation in 1947. For this reason the permanent structure will be handled within the industry on much the same basis. Samplings of the industry in Michigan, Wisconsin, Ohio and Alabama have revealed a wholehearted acceptance of the annual contributing membership idea.

The industry has been divided into foundry market areas to provide compact and contiguous contacts with the industry of any given area. In most areas this membership drive will be introduced by a trustee of the foundation. In this manner the knowledge of the foundation as well as their own personal enthusiasm can be communicated to other industry members. The trustee will seek to turn the area over to a local committee and will assist in some contacts as far as is practical.

While an intensive start will be made beween now and the first of the year, the membership effort will actually become a continuous factor in the operation of the foundation. The fact that the trustees are firmly enough convinced of the merit and value of this program to the industry and are backing up this interest with their time and effort is in itself the most potent recommendation for support of the industry.

Program Is Beneficial

It will be impossible to visit all of the 2000 prospective members of the foundry and allied industries during the remaining two months of the year. It may be necessary to contact some by mail and others over a period of time. The larger the membership and the greater the contributions the more we can devote to the actual program within the universities. Activities of the foundation and administrative costs will remain reasonably constant and the available funds for university work will vary according to the level of business activity within our membership. The program has benefited not only the sand casting division of our industry, but the centrifugal, permanent mold, precision, shell molding and die casting portions as well.

As a result of this decision to establish the foundation on a permanent basis the staff has been instructed to maintain the present features of the foundation, its contacts with students and universities, the annual conference of advisory committees as a means of constantly raising the level of engineering instruction in all universities, plus the listing and placement activities which have featured our progress the last four years. In view of the declining student population a student interest program has become a major need of the industry and is being included as a major part of our effort. The membership drive and the eventual establishment of permamently endowed funds cover the basic activities of the staff organization as set up at present.

AROUND THE COUNTRY

News Reports from . . .

MOST local gray iron foundries are disappointed over the volume of incoming business. Only those producing heavy castings report increasing backlogs. But these companies are in the minority. Companies engaged in small miscellaneous jobbing work can make early shipments and see little in the immediate future to bolster present rate of bookings. Slump in various consumer durable lines, combined with the slow expansion in defense work, is the principal answer to the present situation.

Operations at steel, malleable and nonferrous shops are well sustained, however, with demand for steel castings especially brisk. Deliveries on steel castings are extended weeks ahead.

Raw materials are a particular problem for these latter three groups of foundries, although the gray iron shops find scrap reasonably easy and are obtaining sufficient pig iron to maintain activities. However, they as well as the steel and malleable shops would like to have more iron as few are able to build up even a 30-day supply such as permitted by the National Production Authority.

According to some leading estimates, pig iron capacity this year increased about 1,000,000 tons to around 73,100,000 tons. Most of this increase will come from revamping and improving existing facilities and the blowing in of a new furnace by the Woodward Iron Co., Woodward, Ala. this fall. As the Woodward stack will be devoted to production of merchant iron and almost entirely to foundry grades, shops in this district hope for some relief in this direction. However, requirements in the South have expanded sharply over recent years.

As prices on imported iron continue to increase, few new orders are being placed by district foundrymen. Current iron imports are mostly basic iron. Incidentally, 597,233 net tons of pig iron came in from abroad the first six months this year, against 177,027 tons the first half of 1950 and 795,965 tons in all of last year. Despite the falling off in new buying, it appears that imports for this year as a whole will reach a new record, possibly 900,000 to 1,000,000 tons.

FOUNDRIES are sharing in expanding defense production in this area. California plants hold 15.4 per cent of all prime defense contracts, the state ranking second in the nation in number of such orders. Approximately 66 per cent of the state's defense business is centered in Los Angeles, and since the start of Korean hositilities an estimated $3 billion in defense work have been let in this area for casting-consuming items like aircraft, ordnance and other armed forces equipment. Value of Air Forces contracts in effect in southern California totals $2.3 billion, 65 per cent more than the $900 million active in June, 1950.

Bookings of rated orders by district foundries are leveling off but for some foundries such business is 90 per cent of total backlogs. Some nonferrous foundries are booked through December, 1952 on defense work. However, heavy backlogs are not enough to maintain production when customers are hit by shortages of other materials. For instance, one manufacturer holding prime government contracts was unable to procure aluminum for fourth quarter production needs despite NPA allocations and assistance from government procurement officers. As a consequence, with the plant's production retarded 40 per cent and one-third of its personnel laid off for the lack of work, requirements of aluminum castings also were reduced by 40 per cent.

District iron foundrymen anticipate trouble in the next two months in obtaining sufficient pig iron. The shortage, say trade observers, is far worse in the West than in the East, because blast furnaces of western steelmakers — only local sources for merchant pig — have been down for repairs or overhaul continually. According to the steel men, if foundries can get through the next few months, all furnaces will be back in operation by January and iron will again be available. Foreign iron on the market is $72-$92 per ton, 15-30 per cent higher than domestic, and few sales are being made. Foreign iron quality is said to be poor and the price too high for jobbing foundries. Supplies of coke, previously abundant, are tightening seasonally with coming of winter.

Nonferrous foundries are being hurt hard by shortage of copper and copper alloys and in some cases are receiving by allocation only enough for 60 per cent of production needs.

DEFENSE demand for gray iron castings is not taking up the slack in civilian needs. Operating rates at district gray iron foundries continue to average five days a week but backlogs have shrunk appreciably. This is particularly true of small castings; most producers are able to ship within two weeks or so.

Malleable demand also is off, backlogs being down to around six to eight weeks. However, these shops are relatively busy, with specifications diversified. Steel foundries continue highly active, delivery promises ranging 16 to 18 weeks, and nonferrous shops are generally busy.

(*Continued on page* 142)

PIG IRON SUPPLY TIGHT?

THEN SWITCH TO

MEXITE® BRIQUETTES

FOR CARBON CONTROL IN THE CUPOLA

Replace carbon usually provided by pig iron. Supply a uniform steady source of graphitic carbon. Enable better castings to be poured from 100% scrap charges. Raise carbon, thus reducing chill, shrinkage and hardness . . . increase fluidity and machinability. Easy to use.

139-A

THE UNITED STATES GRAPHITE COMPANY

Division of The Wickes Corporation • Saginaw, Michigan

(*Continued from page* 140)

Among the gray iron shops, those producing heavy castings for machine tools and certain other types of capital goods are busy, although not as active as many had anticipated for this time of the year. The very small shops also seem to have enough work to keep them going without difficulty. Shops doing semi-production work and for consumer durable goods appear to be hardest hit.

Steel foundries are operating five full days a week, and are also pouring on the sixth day. They are not having too much difficulty getting scrap and pig iron, although they would like to have more iron. One of their major problems is getting sufficient aluminum for deoxidizing purposes.

Malleable shops are running into continued stringency in malleable scrap and pig iron. Gray iron producers find scrap in fair supply and also report a betterment in the amount of ferrosilicon available. This latter is ascribed to recently expanded facilities at the plants of two large producers. Chrome can still be had without too much trouble, but the supply of nickel and molybdenum is extremely tight, with much red tape involved in obtaining quantities admittedly needed in carrying out essential defense work.

Open House Held by Pangborn Corp.

A FULL-SCALE open house for families of employees and citizens of the community was staged by the Pangborn Corp., Hagerstown, Md., Sept. 26. School buses brought all senior high school students in the county to the plant, and from 10 a. m. until closing, special city buses carried visitors from various downtown points to the plant entrance.

All operating and administrative departments were in full operation. At the plant, trained guides took groups through the entire plant where the visitors saw the fabrication of blast cleaning and dust control equipment as well as the engineering, accounting, sales and promotion departments. A demonstration room was in operation to illustrate the use of each type of equipment produced by the company

A special edition of the Pangborn magazine was distributed as a souvenir. This publication includes pictures and articles about people and operations of various departments throughout the plant. Guests also enjoyed refreshments in a tent set up in beautiful Pangborn park, across the street from the plant.

Shown here are visitors entering the plant and two interested spectators watching a Rotoblast table in operation.

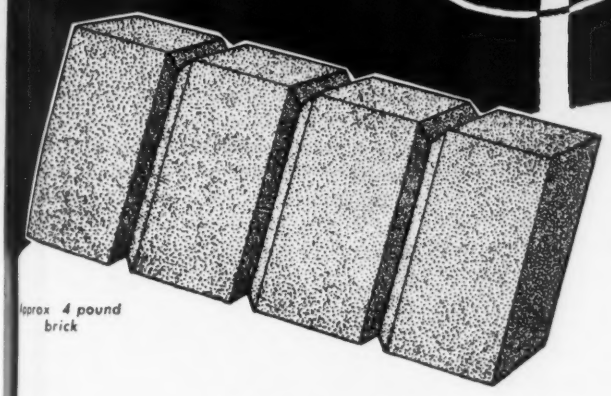
A RASH of labor trouble for Detroit's industry will have repercussions for foundrymen unless the strikes are of short duration. Of extremely serious import for the automotive industry last month was the Borg-Warner—UAW tie-up. Supplier to nearly every car manufacturer, Borg-Warner holds an important key to this quarter's automotive production. Of more immediate concern to foundrymen was the strike of the Pattern Makers Association — AFL against 62 pattern shops in the Detroit and southern Michigan area. Several of the affected shops had just bid on $1 million worth of pattern work for the defense program.

An important exhibit of defense products for which prime contractors are seeking subcontractors is being held Oct. 30-Nov. 2 in the Agricultural Bldg., Michigan State Fair Grounds, Detroit. More than 100 prime contractors are exhibiting, and most of the products come under the heading of military "hardware." Certain to be included are many items requiring castings.

Officials of two foundry companies —Lake Shore Engineering Co. and Grede Foundries Inc.—formed Kingsford Corp. to buy Ford Motor Co.'s Iron Mountain, Mich. industrial properties. Both Lake Shore and Grede currently have part of their operations in Iron Mountain. They will occupy only part of the facility. F. A. Flodin, president of Lake Shore, has been named chairman of an advisory committee to the Michigan Economic Development Commission and will work to expand the industrial import-

(*Concluded on page* 144)

You MUST POUR Clean IRON, IF CASTINGS MUST BE Good



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Famous CORNELL CUPOLA FLUX

OVER 33 YEARS' SUCCESS IN CASTING IMPROVEMENT

Where castings must pass the closest inspection and rejects must be minimized to hold down cost and facilitate prompt shipments—there is a definite need for Famous Cornell Cupola Flux in every charge of iron.

It cleanses molten iron, makes it more fluid, reduces sulphur. You pour castings that are cleaner, sounder—and easier to machine.

Furthermore, this investment pays an extra dividend through *more efficient cupola operation.* Bridging over is practically eliminated. Drops are cleaner. There is less erosion of brick or stone lining. Down time and labor for maintenance is reduced amazingly.

PRE-MEASURED SCORED BRICK FORM eliminates weighing, measuring and waste. You simply toss Famous Cornell Cupola Flux into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges, as per instructions.

WRITE FOR BULLETIN NO. 46-B

Also used extensively in malleable foundries with cupola operation.

The CLEVELAND FLUX Co

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Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze Aluminum and Ladle Fluxes—Since 1918.

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Famous CORNELL BRASS FLUX

LEANSES MOLTEN BRASS even when irtiest brass turnings or sweepings are ed. You pour clean, strong castings hich withstand high pressure tests and ake a beautiful finish. The use of this ux saves you considerable tin and ther metals, and keeps crucible and rnace linings cleaner, adds to lining

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN ALUMINUM so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive Formula greatly reduces obnoxious gases, improves

(*Concluded from page* 142)

ance of the Upper Peninsula.

Recent experience of a large independent foundry in the Saginaw area is fairly typical of what is happening to gray iron melters. Forty per cent of its business is automotive in nature and production for this year is expected to be off about 20 per cent from last. Even more of a reduction is regarded as possible unless some defense work is booked. General operations of local casters appear to have improved since midsummer, but still are extremely spotty.

FORD Aircraft Engine Division of Ford Motor Co., Chicago, is swinging into partial operation and it is expected that first engines will be shipped next March according to schedule. Assembly of the initial engine will start this month (November) so that testing can begin in January.

The magnesium foundry is one of several departments in limited production. The shop was reactivated Jan. 2 this year and first pilot run was made May 10. About 4500 pounds of metal are poured daily and well over 1000 castings had been made by early October. Biggest turned out to date is a collector case weighing approximately 115 pounds Of 15 castings required for the engine, 11 are in production. Maximum capacity of the foundry will be 600,000 pounds of magnesium per month.

In addition to Ford Aircraft Engine Division for which output currently is being stockpiled, castings are being made for two other aircraft engine makers—Wright Aeronautical Corp. and Studebaker Corp. Among active inquirers seeking magnesium castings from this foundry are Ford's Aircraft Accessories Division in Detroit and Nash-Kelvinator Corp.

Moldmaking is entirely a dry sand type of operation with all molds baked. Sand analysis is as follows: Bank sand 91.9; sulphur 2.0; potassium fluoborate 0.4; cereal binder 2.0; core oil 0.7; and water 3.0 per cent.

The foundry, which was held in standby condition following operation by Dodge Chicago Division of Chrysler Corp. during World War II, has been considerably revamped by Ford. Some new equipment is being installed and technique greatly improved, these changes being necessary because of the size and intricacy of castings required now as compared with formerly. Mold and castings conveyor systems are being realigned to accommodate heavier work.

Little new sand will be required during operation since a thermal processing system reclaims more than 95 per cent of the sand used. To provide for greater sand handling capacity, however, a second thermal unit is being installed.

The engine which Ford will make in three models is the 28-cylinder Pratt & Whitney Wasp Major which develops in excess of 3800 horsepower. The cylinders are arranged in four banks of seven each.

Wright Field has not yet announced its decision on converting the former aluminum foundry to magnesium but it is still a good bet that this will be undertaken soon. This operation undoubtedly would be under Ford direction to supply castings to other aircraft engine builders.

Slowing down of orders for castings in recent weeks has eased the pressure on raw materials considerably. Pig iron is still comparatively tight but not to the degree of earlier months this year. Coke supply is more than adequate presently and little trouble is expected from this quarter in the near future. Steel scrap is a difficult item but cast grades have caused little trouble although a tightening is now occurring.

The decline in castings orders is confined principally to gray iron and is attributed to limitations on production of automobiles and consumer goods such as household appliances. The reduced pressure for pig iron reflects the lower melting rates, but the fact that iron production here is at capacity is also a factor. For first time since last May all of the district's 42 blast furnaces are active.

Now that the defense program is starting to roll, foundries are anticipating a pickup in bookings. Discernible at the moment is somewhat more interest of foundries in bolstering inventories of materials. Consequently, a tightening in supplies appears most likely by year-end.

IN its efforts to improve the foundry industry in western Europe, the Economic Cooperation Administration, at the request and expense of Italy, has despatched a five-man team of American foundrymen to survey casting plants in that country. Selected by L. E. Roark, formerly with National Foundry Association and now with ECA's Technical Assistance Staff, members of the team are:

Chairman, George P. Fisher, former vice president, Whiting Corp., Harvey, Ill.; Eugene F. Schultz, foundry plant manager at Pulaski, Va., for General Chemical & Dye Co.; Kenneth L. Smith, formerly of Hansell-Elcock Co., Chicago; James Coutri, foundry labor specialist, Pittsburgh; and James L. Wolfe Jr., formerly with Ampco Metal Co. Inc., Milwaukee.

Other experienced American foundrymen already are on the ground with ECA in Europe. The ECA foundry specialist in Paris is Charles E. Seaman, formerly with Buckeye Steel Casting Co., and the National Foundry Association. At the Hague is Henry M. Laws as technical director; he was formerly with Lake City Malleable Inc., Ashtabula, O. George M. Cannon, formerly of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., is serving as a consultant in Europe. Survey of the Danish foundry industry will be made with assistance of Gottfried Olson, ECA's foundry specialist for Sweden and Denmark, and veteran American foundryman.

Dutch Iron Foundrymen See American Plants

A 14-man team of gray iron foundrymen from the Netherlands arrived in the United States Sept. 24 for an intensive study of American production methods and labor-management relations. The group was scheduled to complete its tour Oct. 31. Leslie A. White of the Economic Cooperation Administration, which sponsored the trip, was project manager for the team.

First stop on the visit was Cleveland where the Gray Iron Founders' Society, with the Foundry Educational Foundation, sponsored a day-long seminar on various phases of the United States gray iron foundry industry. Speakers included: D. H. Workman, executive vice president, and C. O. Burgess, technical director, Gray Iron Founders' Society; George K. Dreher, Foundry Educational Foundation; E. M. Hinze, E. T. Runge Associates; C. F. Walton, Case Institute of Technology; George Miller, Osborn Mfg. Co., and A. D. Barczak, Superior Foundry Inc.

Visits to Cleveland foundries were followed by plant inspections in Cincinnati, Chicago and Milwaukee and conferences in Louisville and Washington.

St. Clair Foundry Corp., Centralia, Ill., suffered fire damage estimated between $3000 and $5000.

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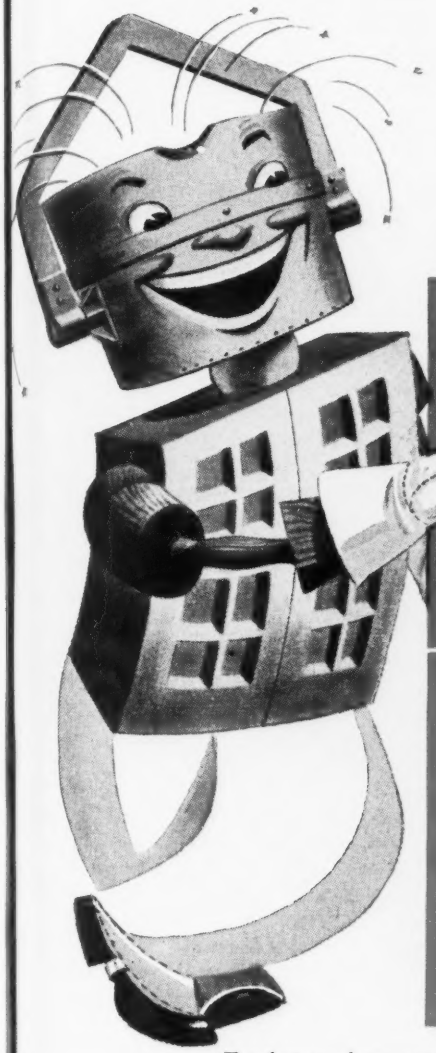

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- **Produce Finer Detail**
- **Reduce Finishing Time**

MORE GREEN STRENGTH: In both green and dry core stages there is greater binding strength with Truscor and Amerikor — they supply the needed green bond and strong affinity between sand granules.

FINE FLOWABILITY AND TEXTURE: The uniform quality of Truscor and Amerikor insures quicker mix — easier blending — less sticking — uniform ramming — increased permeability.

FINER DETAIL: Smooth surfaces—sharp, unbroken edges — less scabbing, cold shut, buckling — because Truscor and Amerikor are scientifically processed to provide these advantages.

EASY, BURN-OUT COLLAPSIBILITY: Because cereal binder burns out rapidly and completely during casting, you are sure of ready collapsibility and easy shake out when you use Truscor or Amerikor.

For better, lower-cost cores, place a trial order for Krause Cereal Binders now — Truscor, if you like a light weight binder; Amerikor, if you prefer a heavier weight. Call any one of the distributors listed below or write us direct.

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MAN-TO-MAN

on the Molder's Bench

"Operation Ash Tray"

By RALPH L. LEE

MOTHER, Mrs. Lee (that's my home superintendent, vice president in charge) suggested the other day that maybe it would be a good idea for us to make our Christmas presents up there in the Lee Hobby Foundry—most of them at least. Like all good executives, instead of issuing an order she wondered if it wouldn't be a good idea.

Of course, I perked right up at the thought, and while I had a number of very exciting research projects on hand, the fact that Mother suggested the idea and the kick most people seem to get out of the things we make—together with a rather long list of folks who ought to have presents—I rolled up the old sleeves, so to speak, and set about production planning.

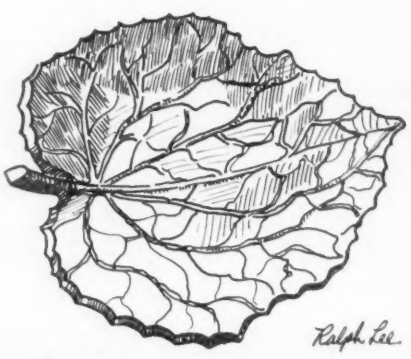
At the production planning meeting (V. P. presiding) we allowed as how pin-up-lamps, letter openers, ash trays and pencil compasses ought to fill the bill. Since we have plate patterns up in the loft for the lamps, letter openers and compasses, and only loose patterns for the ash trays, I thought I'd better go ahead and make one of these cement-plaster matchplates for the trays with two impressions on it. I'd cast them one at a time before with green sand matches.

Now this ash tray is kind o' tricky, being pretty darned thin in spots and cast in brass. The flask I would have to use had seen better days, being somewhat on the rickety side. So I says to myself, the only thing to do is to make a new flask—I'd been wanting to do it, anyway.

By the way, this Lee cam-operated, expanding flask is quite a hunk of stuff—I'll tell you about it some day. But anyway, I got busy on the flask —had to make some castings for it, with several major pattern changes. Since I took longer getting ready for the ash trays than I thought I would I had to explain the production hold up to the V.P. The new flask turned out to be a dandy.

In the past I'd been making the frames for my cement plates out of wood but I was determined to make them out of aluminum some day. The kind that you can take off of a plate once it's made and use it to make another—sort of an interchangeable deal involving one frame and a flock of plates. This turned out to be quite a project too, involving a lay-out, patterns, castings and some machining. With only week-ends to work in the shop and time a fleetin' the V.P. raised an eyebrow when I came up with another explanation regarding the Christmas present situation. I've noticed that most good executives are much more interested in results than in the most plausible explanations.

But in spite of delays and with my new flask (it's a diller), together with the new quickly demountable, super-duper plate frame with pin guides and



The pesky ash tray

everything, I set about to make the plate. In making the mold for it I used brand new facing sand, riddled it through a fly screen riddle (so fine and soft). While I don't want to brag—my shrinking violet nature resists it—I'll have to admit that this mold was just about as near to being a real work of art as you'll find anywhere.

This time I smothered impatience and let the plate dry—good and dry—before I shellacked it. You know, when you get right down to it, I don't know of any greater satisfaction than that of starting out to mold with a new plate, one you've made yourself, including the original patterns, a brand new flask, a sand heap in fine shape, with good boards handy and all your tools within easy reach.

On the other hand, I don't believe there is any greater letdown, when you've done everything you think you ought to do, than that of raking the first casting out of the sand and finding it scrap. I had made any number of ash trays one at a time with the old equipment and had no trouble at all. But now with everything new and as bang-up as I could make it, there were misruns in both castings.

I wondered whether my brass was hot enough—maybe my pyrometer had gone screwy. After changing the point (thermo-couple) and checking the instrument against another one I still wasn't sure.

Then I remembered that the furnace didn't seem to be as hot as usual, though the metal seemed all right when I poured it. I relined the furnace while eyeing the blower; it hadn't been down in years. It's a wonder that blower worked at all, for it was choked full of gunk, and the little motor that runs it was in even worse shape. The electric lead to the field coils broke when I touched it. Then I fixed everything up shipshape—should have done it long ago.

Again I made some molds and poured them—with the same results in misruns. This time Mother felt downright sorry for me, which reminded me that good executives can have a heart along with their insistence on results. I tried different gating; still no dice and the infuriating, blankety-blank under-handed mystery was *why?* Why in the name of all that's holy was I able to get good castings one after another with the old rickety setup and get nothing but scrap with everything brand new and bang-up?

I made a new plate and, so help me, had the same doggone results. Woe is me and a couple of damns. But finally with plain dumb stubbornness and

(*Concluded on page* 149)

WRITE YOUR OWN TICKET

BESLY TITAN
No. MM 421
Specifications
(Once the "Specs" are established, you can re-order quickly by code number — certain that every wheel will be exactly the same — job-fitted — a perfect match for the needs of your work.)

On Grinding Wheel "Specs"

You know the results you want in your grinding. Besley-Titan is organized to formulate wheels which will do it *your* way — fitting the requirements of the job with wheel specifications that will do it . . . material, wheel-speed and innumerable other factors considered. That's what we call *job-fitting.* Sounds like a luxury . . . but *job-fitted* Besley-Titan Wheels *cost you no more* than "stock" wheels — and delivery in just a few days is an organized routine.

Free-cutting, long-wearing Besly-Titan Abrasive Wheels and Discs are accurately bonded to snag or finish at grinder speeds available in your foundry. You'll find they save time, labor and materials on every operation.

You'll want to check the production and quality-boosting possibilities of this set-up . . . Write for complete information and individual formula recommendations, including Trial Order Plan.

BESLY-TITAN

ABRASIVE WHEELS AND DISCS

Are "Job-Fitted" for the Foundry

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CHARLES H. BESLY & COMPANY

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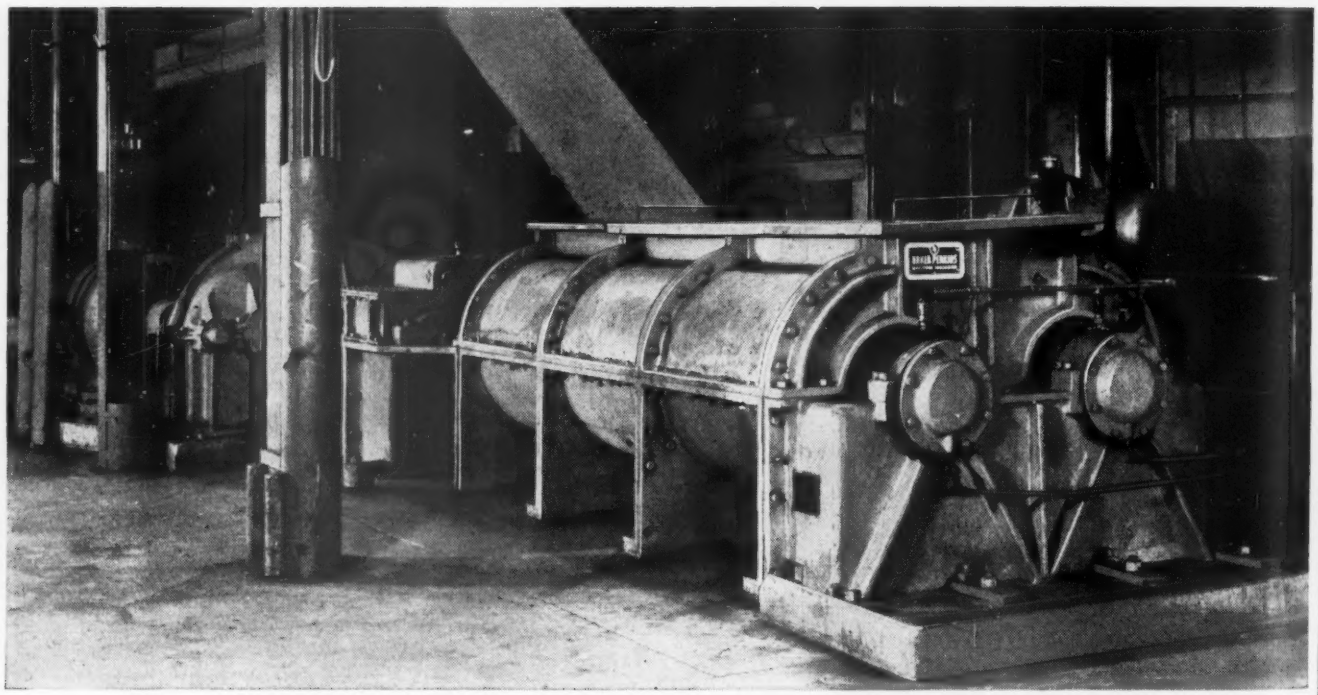
Representatives in Principal Cities

17,280 TONS

OF MOLDING SAND PER 3-SHIFT DAY

processed by Baker Perkins mullers in world's biggest grey iron foundry



Six Baker Perkins Continuous Mullers are on the job at the world's biggest grey iron foundry helping to meet tough, tight schedules that depend on high daily production. Each B-P 5A Muller is conditioning 120 tons of molding sand each hour during an 8-hour shift. In the course of a 3-shift day, the six B-P Mullers handle the staggering total of 17,280 tons of sand that comes to the molding lines thoroughly mixed and tempered. Baker Perkins Continuous Mixers are ideal for processing molding sand on a big scale. Unique blade arrangement in B-P Mullers thoroughly mulls and aerates the tumbling sand mass, and each grain of sand is correctly coated with bond. B-P Mullers will deliver an uninterrupted flow of 30 to 120 tons of good sand per hour depending upon the size unit. Baker Perkins Continuous Mullers produce improved sands that mean better castings and lower scrap loss. They dependably meet the demands of high production automotive foundries and they can do the same for you. Write, wire, or phone for the full story on Baker Perkins Continuous Mullers.

BAKER PERKINS INC.

SAGINAW, MICHIGAN

(*Concluded from page* 146)

considerable teeth gritting I cured the trouble. It wasn't the furnace—it wasn't the gating—nor the pyrometer—nor the flask—nor the metal. It was shrink in the plaster-cement gunk I used to cast the plate. The casting was so thin and so close to the ragged edge that shrink in the plate let the cope down just far enough to raise all of the hulla-baloo.

Well, by golly, everything's working O. K. now on the ash tray job. In fact, I got such a bang out of thumbing my nose at the trouble that Mother had to call a halt on production. The Lee Hobby Foundry was getting clogged with ash trays.

In looking back over the battle of the ash trays as I was getting down the patterns for the lamps, letter-openers and compasses, I couldn't help but think how utterly impossible it would be to even try to explain to an outsider just what it is about the foundry that keeps a fellow married to it for life.

Maybe it's the way trouble can hide under every step in the process from patterns to shakeout, and the way it scampers from step to step when chased. Then, too, it might be that in this so-called age of science, where nothing is supposed to be a mystery any more, and with everything being clocked, metered, weighed and measured, then done by rote in jigs and fixtures, maybe the foundry is one of the only crafts left where real adventure with the unknown makes life worth living.

Maybe this is laying it on a bit thick but it's the way I feel.

"Too bad, Joe, but we need that ladle."

Book Review

Machinability and Machining of Metals by Norman E. Woldman and Robert C. Gibbons, cloth, 518 pages, 6 x 9 inches, published by McGraw-Hill Book Co. Inc., New York. Price $7.50.

As the authors point out in the preface, machinability is concerned with the various physical characteristics of metals and their effect on cutting tool wear, chip formation, etc., while machining deals with the actual cutting operations. Since the approach to the subject is both theoretical and practical, the authors have drawn data from experimental laboratories and actual plant operations.

The book opens with a discussion of the principles of machining followed by mathematics of machining, and cutting tools and tool design. Then detailed information on the various metals is presented in separate chapters, including steel—general; ingot iron, wrought iron and low-carbon steel; plain medium and high-carbon steels; alloy steels; tool and die steels; stainless steels; cast iron; aluminum alloys; magnesium alloys; copper alloys; nickel alloys; zinc alloys; special metals and alloys.

Meetings of Interest to Foundrymen

Nov. 1-2—Metals Casting Conference, sponsored by Purdue University with Michiana and Central Indiana AFS chapters, Purdue University, West Lafayette, Ind.

Nov. 1-2—Industrial Management Society, annual time and motion study and management clinic, Sheraton Hotel, Chicago

Nov. 2—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

Nov. 7-9—Meehanite Casting Manufacturers, annual meeting, Hotel New Yorker, New York.

Nov. 8-9—Quad City Regional Foundry Conference, Blackhawk Hotel, Davenport, Iowa

Nov. 8-10—Steel Founders' Society of America, Technical and operating Conference, Carter Hotel Cleveland

Nov. 15-16—Magnesium Association, annual meeting, Biltmore Hotel, New York

Nov. 19-20—National Metal Trades Association, annual convention, Palmer House, Chicago

Nov. 26-Dec. 1—Chemical Industries Exposition, Grand Central Palace, New York

Nov. 30—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Dec. 6-8—American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Hotel William Penn, Pittsburgh

Dec. 10-15—Spanish Iron & Steel Institute, general assembly, Madrid, Spain

1952

Jan. 14-17—Plant Maintenance Conference and Show, Convention Hall, Philadelphia

Jan. 17-19—California Regional Foundry Conference, Northern and Southern California Chapter, AFS, San Francisco

Jan. 18—Malleable Founders' Society, semi-annual meeting, Hotel Cleveland, Cleveland

Feb. 7-8 — Wisconsin Regional Foundry Conference, Wisconsin Chapter, AFS, and University of Wisconsin, Hotel Schroeder, Milwaukee

Feb. 21-22—Birmingham Regional Foundry Conference, Birmingham District Chapter and University of Alabama student Chapter, AFS, Tutwiler Hotel, Birmingham

Feb. 22—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Mar. 3-7—American Society for Testing Materials, spring meeting, Statler Hotel, Cleveland

Mar. 7—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

Mar. 18-19—Steel Founders' Society, annual meeting, Edgewater Beach Hotel, Chicago

Mar. 28—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Apr. 25—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

May 1-7 — American Foundrymen's Society, annual convention, Atlantic City, N. J.

May 6-9—International Lighting Exposition and Conference, Public Auditorium, Cleveland

May 16—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel New York

May 23—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

June 16-17—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

June 23-27—American Society for Testing Materials, annual meeting, Statler Hotel, and Hotel New Yorker, New York

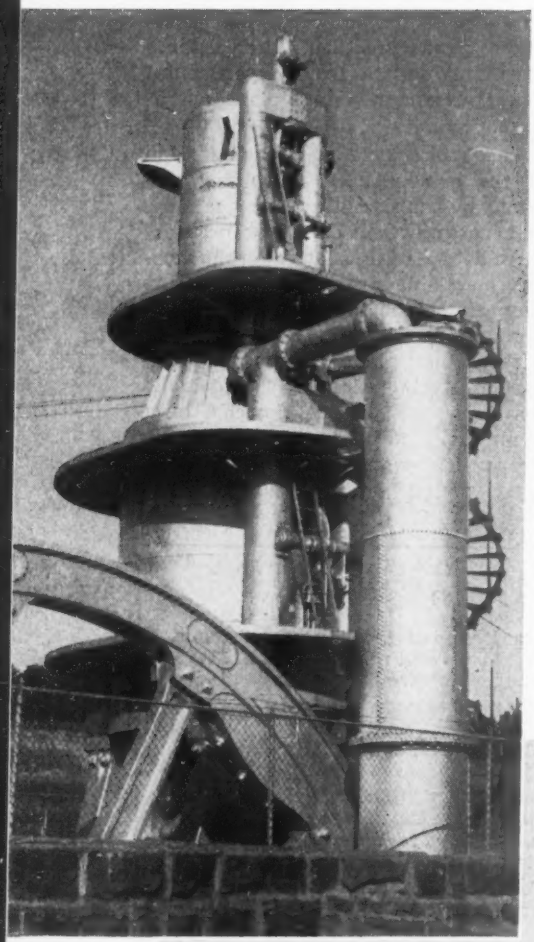
July 25—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Sept. 8-12—Instrument Society of America, annual meeting, Cleveland

Oct. 16-17—Gray Iron Founders' Society, annual meeting, Hotel Cleveland, Cleveland

HUGE PUMPING ENGINE

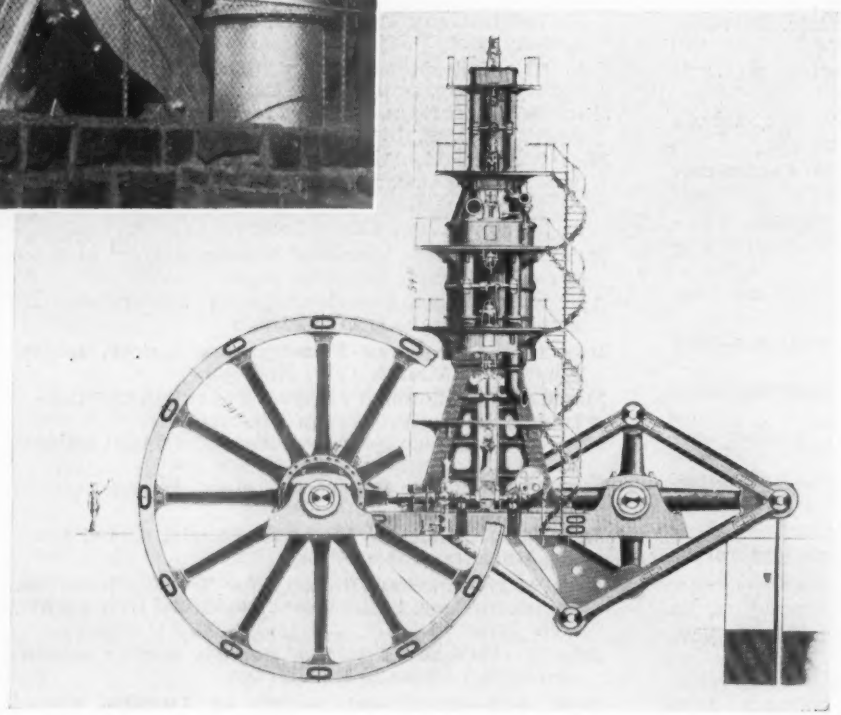
Still Stands at Abandoned Mine



By PAT DWYER
Engineering Editor
FOUNDRY

ABOUT the time the fabulous Paul Bunyan, his blue ox Babe, and his crew of white water burlers and bully boys were mowing down the forests of Michigan, another equally spectacular crew of hardy adventurers were tearing great quantities of iron ore from deposits laid down in the Upper Peninsula long before Paul squalled his lusty way in the world in northern Maine; long before Tubal Cain set up his first primitive forge; and, according to our best journeymen geologists, shortly after this old world started whirling in the lathe of time and throwing off sparks.

Top of the engine towers more than 50 ft above ground level



General side view showing 40-ft flywheel, high and low pressure cylinders, walking beam and pump rod. Total weight of engine is 600 tons

Land denuded of forests may be reseeded for a new growth of trees. When the ore body has been removed from a mine, the mine is done, finished. The period of active life may be long or short, but eventually the last car of ore is hoisted to the surface. The great sheave wheels on the bankhead whirl to a stop. Engines and pumps are abandoned, moved elsewhere, or broken and sold for scrap. The miners move on to where new ore deposits have been discovered.

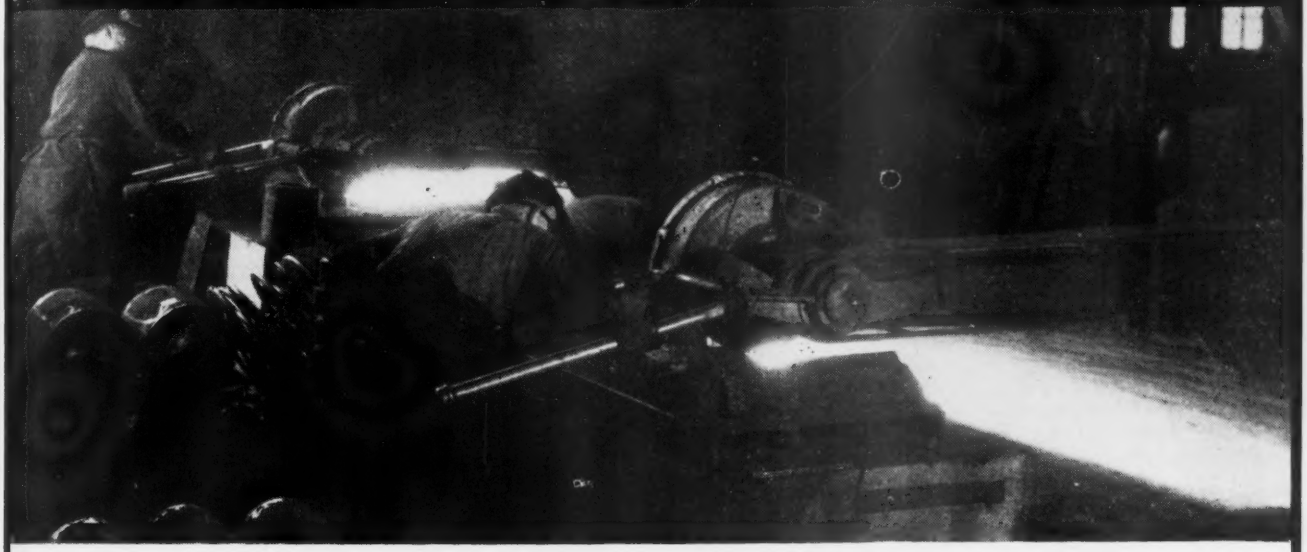
Illustrative of the foregoing, particularly from an engineering and foundry standpoint, is a gigantic pumping engine, the last remaining bit of tangible property of the once busy and prosperous Chapin Mine. The engine stands beside the abandoned *C* or Ludington shaft, a short distance from the business section of Iron Mountain, Mich., and within a stone's throw of the state highway leading up to Michigan's famous copper country, the Keweenaw peninsula and the Michigan College of Mining and Technology at Houghton.

When the mine's iron ore reserves were exhausted, the Oliver Mining Co. (United States Steel Corp.) deeded the surface plant to the trustees of Dickinson county, with the thought in mind of preserving it as a memorial to the early mining days on the Menominee iron range. The steel headframe remained in place for many years as a companion piece to the pumping engine. It was dismantled to help meet the nation's urgent need for scrap metal during World War II. With the removal of the enclosing building by the former owners, the engine was exposed to the elements, and the elements are none too gentle in upper Michigan. By order of the new trustees the engine was given two coats of protective aluminum paint which adds to its impressive appearance and attracts the eyes of all those passing on the main highway.

The engine, a late 19th century version of the Cornish pumping engine employed for many years in the min-

(*Continued on page* 153)

MACKLIN
GRINDING WHEELS



Whether your job is large or small, requires vitrified or resinoid, MACKLIN *is the right wheel for you.*

MACKLIN Grinding Wheels, with built in fast cutting and long life, assure you of maximum efficiency. MACKLIN will "Protect your Production" at all times.

You should, as a user of resinoid wheels, try the new MACKLIN B1268 bond, which has proved outstanding for all foundry grinding operations. Call your MACKLIN representative for details.

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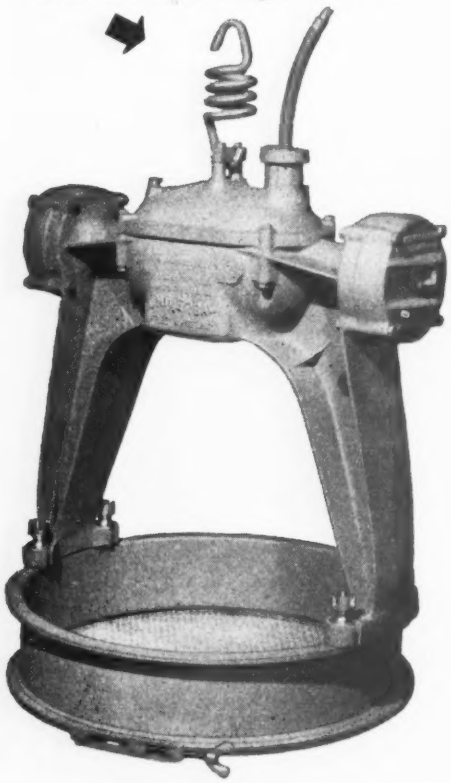
HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

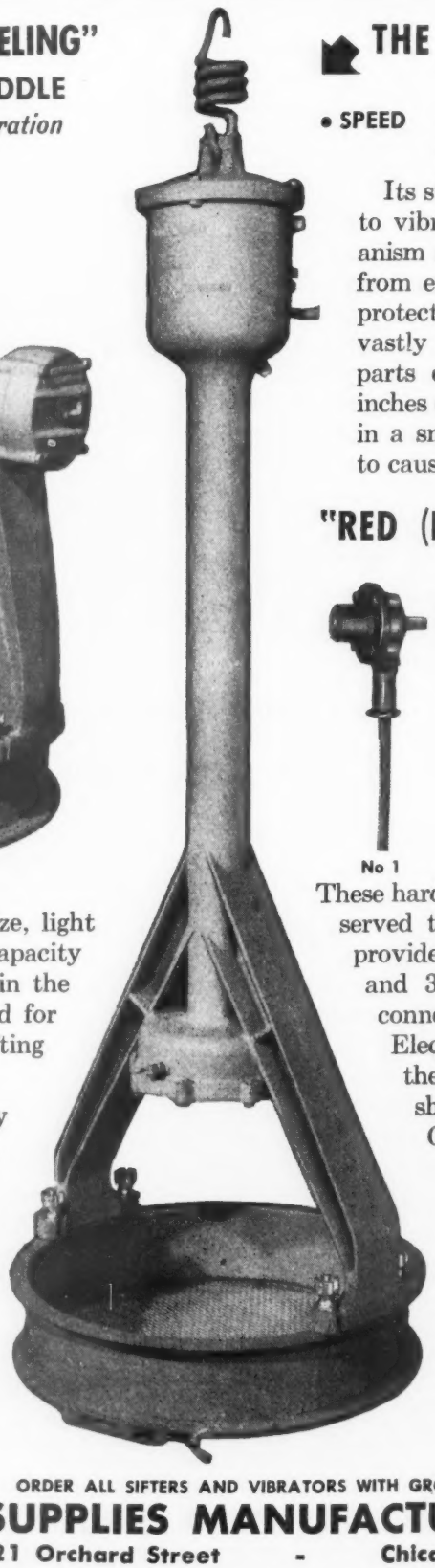


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

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- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area — are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

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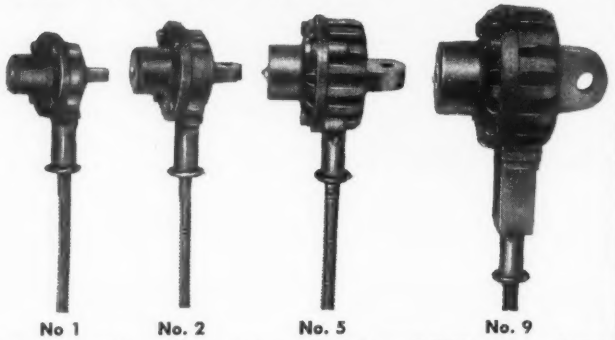

No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

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Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

(*Continued from page* 150)

ing areas of Cornwall, England, was designed by a famous engineer, Edwin Reynolds, and built by the A. P. Allis Co., Milwaukee, predecessor of the present Allis-Chalmers Mfg. Co. The 1897 catalog gives the following information concerning this mine pumping engine:

The accompanying illustration shows the large pumping engine built for the Chapin Mining Co., Iron Mountain, Mich. The machine is designed to pump 3000 gpm from a depth of 1500 ft. The high and low pressure steam cylinders are 50 and 100 in. diam, respectively, and have a common stroke of 10 ft. The flywheel, 40 ft diam, weighs 160 tons. Total weight of the engine exclusive of pumps and shaft work is 600 tons. The pump rod is attached directly to the beam end which overhangs the shaft. Pumps are single acting Cornish type with plungers 28 in. diam and 10 ft stroke. Number of strokes per minute varies from four to ten. Pumps are arranged in series, each set having a lift of about 200 ft.

Sections Linked Together

It is interesting to note construction details. There is a total absence of welded joints, so common today in machine parts. The illustration shows the prolific use of shrunk links to hold the sections together. The three arms of the walking beam that are in alternate tension and compression are supplemented with steel or wrought iron links paralleling the cast columns.

The once brilliantly polished brass railing that wound majestically up along the cast iron stair has been carried away piecemeal by vandals or curio seekers in spite of the 10-ft fence provided by Dickinson county authorities. Other acts of demolition have defaced the once proud old lady. Yet she stands serenely there in the vastness of the once busy mine site as if knowing that her equal in size never has been seen elsewhere.

Little imagination is required to visualize the operating engineer in that early day in mining history at Iron Mountain. We can picture him climbing ceremoniously up the winding stairs of his new and powerful charge to check packing glands and lubrication 54 ft above the engine room floor. A man could be proud of a responsibility like that and there is no doubt that the beautiful big machine got the loving care she deserved.

While full and unstinted credit is accorded the highly competent engineer who designed the engine, it is to be regretted that apparently no data are available on the foundry, machine shop and erection practice involved in making the castings, machining them and assembling the massive parts. It is reasonable to assume that the engine was assembled on the erection floor and tested under working conditions. It was then taken apart shipped to Iron Mountain by rail and erected again on a permanent foundation, with the flywheel in a pit 16 ft deep. The 160-ton wheel is made up of a hub, 12 arms and 12 rim segments. The arms are bolted to the hub and to the rim, and the rim segments are attached to each other by steel or wrought iron links heated and then shrunk in place over suitable seats in the rim. Since there is no record of a 40-ft-diam boring mill in existence in 1890 it would be interesting to know how the face and the ends of the rim segments were machined.

The low-pressure cylinder, 100 in. diam and something over 10 ft high, flanged at both ends and presumably 2-in. wall thickness, estimated weight 10 tons, was molded vertically in loam and the metal entered through a ring of pop gates on the upper flange. The method is not new. The original Cornish foundrymen — and presumably others—always gated cylinders and other large ring castings in that manner.

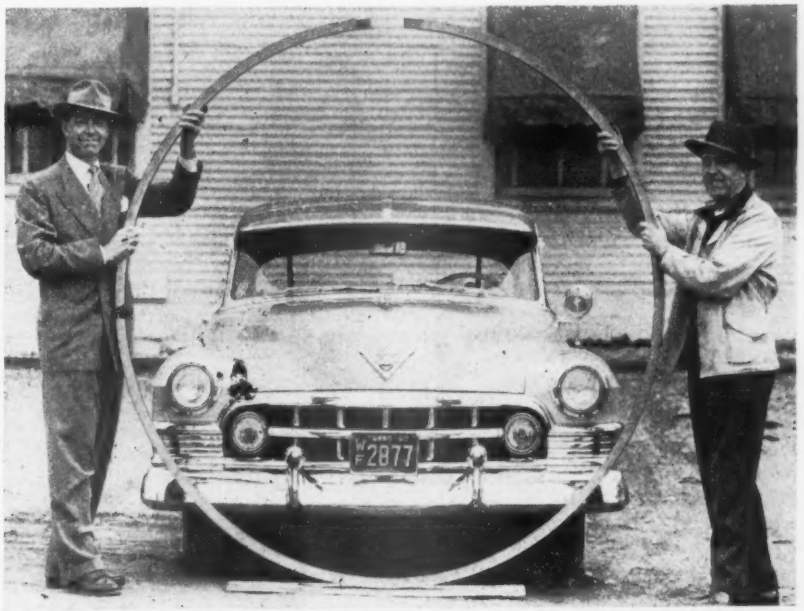
The arms and hub might have been molded in green sand, but since this was a special job, the largest ever attempted up to that time, it is quite probable that the molds for these castings were dried.

This essay was prompted partly by a desire to show that old-time foundrymen, machinists and engineers were highly skilled and competent craftsmen; and partly as a result of rereading an article by an anonymous author with a nice gift of words, which appeared in THE FOUNDRY many years ago. He described a trip through an abandoned mining district in Cornwall, England, where tin and copper have been mined since the somewhat indefinite period in the world's history known as the Bronze Age. Wealth in the surrounding seas and underground prompted the favorite Cornish toast—"Fish, tin and copper!" — drunk with smuggled French cognac.

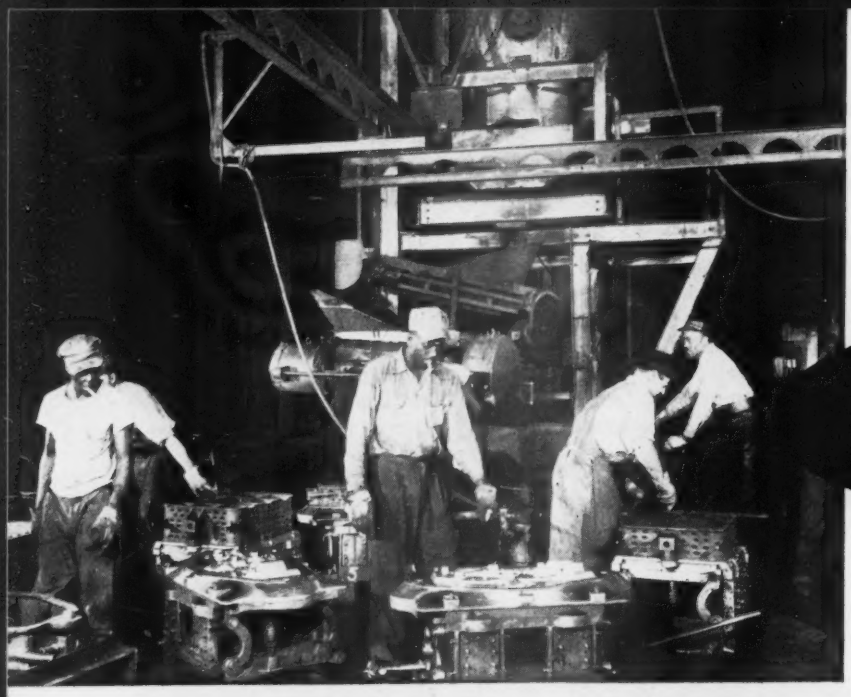
Many a time in fancy I accompanied my friend through western England and traveled along the granite spine of the Cornish peninsula, my interest infallibly aroused by the deserted tin mines scattered everywhere over the landscape. Each stretch of purple heathered moor has its ruined engine house with a chimney from which smoke long since has ceased to roll. Almost every eminence that rears itself against the skyline is crowned by a pile of gaunt derelict masonry resembling nothing so much as an ancient feudal keep of the days of the Henrys and Richards.

For safety's sake many of the shafts have been choked artificially by blasting. However, some remain unguarded with the exception of a low stone ledge. Others have not

(*Continued on page* 156)



PISTON RING: Double Seal Ring Co., Fort Worth, Tex., recently produced this step cut, cast iron piston ring for a hydraulic intensifier at the Gary, Ind., plant of United States Steel Corp. Shown holding the 83 in. in diam, 200-lb ring are Henry S. Green, Double Seal president, left, and William T. Green, vice president and general manager



A Double Belt Stationary Sandslinger on a Studebaker production molding line rams molds for intake and exhaust manifolds. Cope and drag patterns are mounted on six B&P Champion Hand-Draw Machines on a 16 foot B&P Turntable.

SANDSLINGERS

SPEEDSLINGERS

One of four Speedslingers at Studebaker
31x47 inch drags for the Studebaker Cham
engine block. The overhead B&P Plate Fe
supplies a smooth flow of molding sand.
terns are mounted on three B&P Cham
Speed-Draw Machines on a B&P Turntabl

One of two Swingslingers at Studebaker rams cylinder block cores for the six-cylinder Studebaker auto and truck engines. The overhead B&P Plate Feeder delivers a measured flow of core sand to the Swingslinger.

HELP STUDEBAKER . . .

DOUBLE CAPACITY

In a foundry mechanization program that resulted in doubled capacity, Studebaker Corp., South Bend, Ind., chose slingers to ram most of their molds. All of their motor blocks—the new V-8, the six, and the truck six—are Speedslinger rammed. These block molds are rammed on two production molding lines, each of which has two Speedslingers with overhead B&P Plate Feeders, B&P Turntables, and B&P Champion Speed-Draw Machines. Because of Speedslinger flexibility, the jobs on these lines may be interchanged at any time, thus giving Studebaker a completely flexible production set-up.

Many of Studebaker's smaller molds are also slinger rammed. A stationary Sandslinger rams intake and exhaust manifold molds on another production unit utilizing a B&P Turntable with six B&P Champion Hand-Draws. Two Swingslingers in the core room perform still another important job, ramming the cylinder block cores for both the large and small six cylinder blocks. Here again, slinger flexibility permits Studebaker to ram either the large or small cylinder block cores on either of two twin units.

Read the Studebaker story currently featured in this magazine. You will see what a large part slingers have played in Studebaker's expansion. They will be just as effective in your foundry. Write today for more information!

WINGSLINGERS

B&P

MEMBER FEMA

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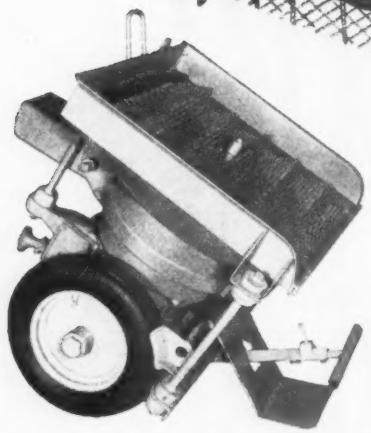
Manufacturers of the Sandslinger • Speedslinger • Hydra-Slinger • Speedmullor • Mulbaro • Screenarator • Nite-Gang • Junior Nite-Gang • Preparator • B&P Combination Sand Conditioning and Mulling Unit • B&P Champion Speed-Draw • B&P Plate Feeder • B&P Turntable • B&P Gyratory Screen • B&P Roller Riddle



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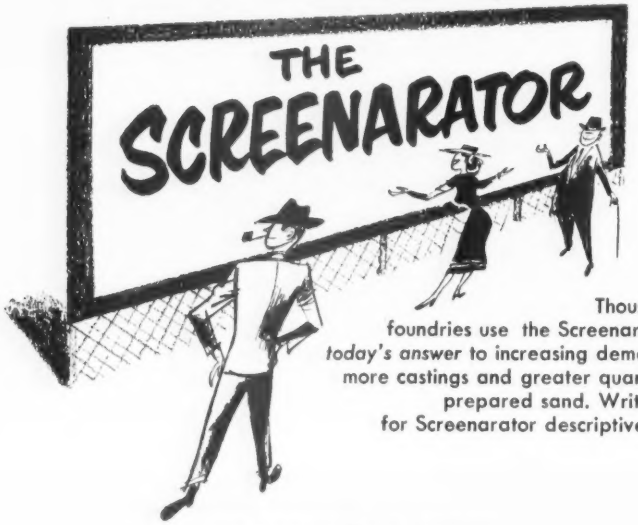
Got that hard-to-solve sand problem? Need prepared backing sand and special facing sand intermittently in several locations? The Screenarator is the answer . . . it's *portable* . . . it prepares as high as *45 tons per hour* . . . it produces *thoroughly* screened, *twice* aerated, lump-free, flowable sand . . . at *lowest* original and maintenance cost.



Thousands of foundries use the Screenarator! It's *today's answer* to increasing demands for more castings and greater quantities of prepared sand. Write today for Screenarator descriptive folder!

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(*Continued from page* 153)

even this protection. Their gaping mouths fringed with fern or bracken remain as cavernous memorials to an age when English tin supplied the demand of half the world.

Numbers of mines still are working near Cambourne and Redruth. The massive old-time pumping beams wheezily rise and fall. Sky and buildings are dull and depressing and the general effect is the same as that produced in more favored localities on a rainy dismal day in the fall of the year. Every second man on the street is a Cousin Jack, a local term that has followed Cornish miners around the world. The district is a living picture of what all mining tracts were when Victoria was a girl queen and competition from Perak and Selangor in faraway Malay was unknown.

Odds Against the Cornish

History of later years would seem to indicate that nature has taken sides against Cousin Jack. Cornish ore must be won by hewing blocks of the living granite from a deposit that continually has grown harder since the days of Adam. The granite of Asia, softened and permeated for ages by tropical ground waters, easily is cut by Chinese miners and the refined and finished product is shipped all over the world from the fortified British city of Singapore.

One of the most famous of all Cornish mines, the Ding Dong, stands on a lonely hillside a few miles from St. Ives. At intermittent intervals one hears a rumor that it will be reopened. Any person who climbs the gorse-clad slope and rests his eye on the desolate engine house and the grass grown mounds that mark the place where the residue was dumped, will experience no difficulty in realizing that Ding Dong's day is over. The houses and the chimneys belong to another day and another earlier age. They occupy a legitimate position as landmarks with the nearby stone circle of the Nine Maidens and the Lanyon Quoit where 2000 years ago a savage chieftain was buried. Thousands of tons of tin are hidden beneath Ding Dong and many other old abandoned Cornish mines. In all probability it will remain there undisturbed until the time arrives for King Arthur to throw aside his disguise as a red billed chough (chuff), to which all good Cornishmen doff their hats, and comes again to his own land. That time lies in the indefinite future which mortal men call —never.

(Photos and pertinent data through courtesy of Wilhelm Baum, Wilhelm

Baum Machine Works, South Haven, Mich.; Allis-Chalmers Mfg. Co., Milwaukee; *Compressed Air Magazine,* Ingersoll-Rand Co., New York; *Iron Mountain News,* Iron Mountain, Mich.

Foundry Course Fosters Customer Relations

Builders Iron Foundry, Providence, R. I., made a new approach to customer relations when it invited design engineers, draftsmen, production engineers, supervisors, inspectors and purchasing agents to attend a course in foundry practice and casting design Sept. 17-21. In addition to technical personnel of Builders Iron Foundry, the teaching staff consisted of representatives from nine other companies. Thirty-nine hourly lectures were given on eight different phases of the general topic.

Book Review

Corrosion Causes and Prevention, by Frank N. Speller, D.Sc.; 686 pages, 6 x 9 in.; fabricoid; published by McGraw-Hill Book Co. Inc., New York and London; price $10.

This revised third edition brings a systematic and authoritative presentation of the theory of corrosion, along with a detailed description of methods of preventing corrosion. Dealing particularly with the ferrous metals, the book tells what corrosion prevention means in eliminating waste; explains corrosion—kinds and factors of their nature and occurrence; shows how to prevent corrosion in various engineering fields and talks about the economic aspects of corrosion prevention.

All the material in the book has been brought up to date. New sections have been added on biological influence and cathodic protection. The most recent advances in practical preventives are described. The first part of the book describes facts and factors already known, also the generally accepted electrochemical theory of corrosion. This leads up to a discussion of a system of classification of corrosion phenomena and the principles of corrosion testing. The second part applies these principles to corrosion prevention under conditions found in the air, under water, under ground, in closed water systems, steam generators, steam and hot water heating systems, in the chemical industries and in other situations.

Free of mathematical and thermodynamical terms, the book presents a simple, easy to understand explanation of the mechanism of corrosion and of the practical methods of prevention as applied to various types.

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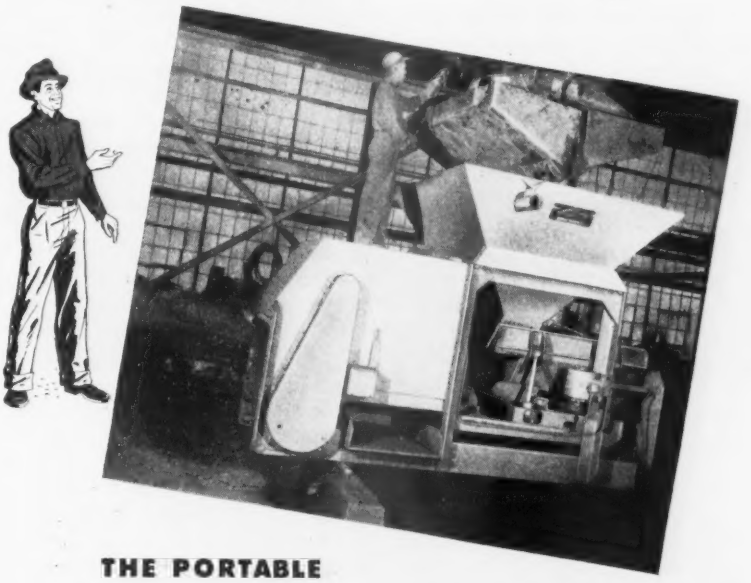

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MALLEABLE FOUNDERS' MEETING

Marks Industry's 125th Anniversary

MEETING of the Malleable Founders' Society, held at the Hotel Cleveland, Cleveland, Sept. 21, provided the occasion for the society to mark the 125th anniversary of the founding of its industry, as well as the transaction of business concerned with the organization's activities. Society President Cal C. Chambers, president, Texas Foundries Inc., Lufkin, Tex., presided.

Reporting as chairman of the research committee, Leon J. Wise, Chicago Malleable Castings Co., Chicago, announced that his group has selected as its next research project, the development of a scientific approach to efficient gating, feeding and pouring. This project will be carried out at Cornell University, Ithaca, N. Y., under the supervision of Prof. P. E. Kyle.

In reporting on activities of the market development committee, Chairman Roy Hobson, National Malleable & Steel Castings Co., Cleveland, announced that the third annual Market Development Conference to be sponsored by the society would be held at Case Institute of Technology, Cleveland, next Apr. 10-11. Mr. Hobson also complimented the members on their support of the program for publicizing the industry's 125th anniversary by newspaper advertising and publicity throughout the country.

Economy in Cleaning Room

An interesting summary of the shell molding process was presented by Bernard M. Ames, senior metallurgist, U. S. Naval Shipyard, Brooklyn, N. Y. Mr. Ames emphasized that all jobs are not suitable for production by the shell molding process. Necessary volume is a basic requirement, because tooling costs are high. The design of the casting also must lend itself to a suitable parting, gating and heading arrangement. The most important factor will be how much saving can be made in the cleaning room and machine shop. The biggest potential economy will be derived in the cleaning room.

Sand employed in shell molding may vary in fineness from AFS 90 to 230, with a clay content below 3 per cent. Amount of resin employed will vary from 5 to 9 per cent by weight of the sand used. Resins may be either a single or a two-step formulation, the latter being employed almost exclusively since the two-step resins, incorporating an accelerating material, have much better storage characteristics and shelf life. All resins are not satisfactory for every casting design. Mr. Ames said that the most satisfactory resins for molds are those with low to moderate flow characteristics, high melting points and fast curing rates.

The speaker recommended use of a conventional foundry muller for mixing the sand and resin. The wheels should be raised about 1 in. from the bottom, and mixing should proceed for about 7 minutes. The pattern assembly is brought to a temperature of approximately 350 to 500° F, coated with a mold release agent (generally a silicone-water emulsion 5 to 10 per cent by volume) and then invested with the sand-resin mixture. Curing the mold for 1 minute at 600° F is generally sufficient.

Alloy cast iron is the material used principally for making patterns and plates. Sound principles of gating and heading must be adhered to. For the ultimate in surface finish bottom gating is essential, and tapering the down-sprue in a ratio of 4 to 1 has been found desirable.

In discussing coreblowing, Mr. Ames stated that one productive arrangement for producing cores which has been found useful is the employment of heating units in the box and an automatic quick-opening and closing device. The cores thus are cured in the corebox without the necessity of a separate oven. Contrary to common conception, use of steel shot as a backing agent for the shell molds does not provide a chilling action. Actually, tests have shown that a finer grain size pattern results with a green sand mold than with shot-backed shell molds. From the metallurgical standpoint, Mr. Ames indicated that gray iron, malleable iron and nodular iron are more compatible with shell molds than are any of the other commercial alloys with the exception of aluminum-base material.

A review of the major accomplishments by the Foundry Educational Foundation during the past four years was presented by George K. Dreher, executive director. He pointed to the growing number of engineering students who are becoming better acquainted with castings and the foundry industry, to the fact that engineering schools have invested substantially more of their own funds in their foundry facilities than has been furnished them by the Foundry Educational Foundation, and to the further fact that engineering graduates are entering the foundry industry at a much more rapid rate than had been anticipated.

The important cash savings to be realized from an effective accident prevention program were discussed by Charles S. Butters, Liberty Mutual Insurance Co., Philadelphia. He emphasized that the non-insurable losses resulting from accidents cost four to ten times the medical and compensation costs. The basic plan of an intelligently prepared accident prevention program involves these essentials: 1. Management support; 2. An adequate safety organization; 3. Active participation by supervisors; 4. Effective employee education; 5. Control of accident hazards; 6. Adequate first-aid and medical facilities; 7. Regular inspection to detect unsatisfactory working conditions; 8. Investigation of accidents to make certain that corrective steps are taken.

Early Malleable Foundries

At the luncheon session, President Cal C. Chambers referred to the 125th anniversary of the first production of American malleable iron by Seth Boyden, and appropriately cut a birthday cake in honor of the occasion. Historical references to the earliest malleable iron foundries of Newark, N. J., were made by two men associated with successors to these firms. —Philip R. Van Duyne, Meeker Foundry Co., and Louis D. Sacks, Newark Malleable Iron Works.

Principal speaker at the luncheon was Dr. George S. Benson, president, Harding College of Arkansas. Dr. Benson said that one of the greatest crises we face today is the propaganda war initiated by the communists to destroy confidence on the part of the American public in our system of private ownership of property. The purpose of this campaign, he said, is to so weaken our belief in our own way of life that we will be unwilling to sacrifice to sustain it; to weaken our economic structure until our financial future is jeopardized; to weaken our will to fight for the defense of our way of life; and finally, to carry on extensive sabotage in event of war with the communists.

He urged that the public, especially the oncoming generation, be acquainted with both the factors which have made America great, and with the methods and objectives of the propagandists.

Shown are Fremont Flasks and Jackets as used at Burt Foundry Co., Toledo, Ohio.

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Talk About Ease Of Handling

Magnesium weighing 1/3 less than aluminum, Flasks are easier to handle.

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With twice the tensile strength of aluminum and solid, bolted and welded corner construction, they withstand long, continuous usage in machine molding.

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Accurately machined inside surfaces and flanges. Steel faced top and bottom flanges. The one-inch GROOVLOCK FOOLPROOF PIN (particularly adapted to cope or drag pattern jobs) guarantees perfect alignment indefinitely. Other types of standard pin fittings available. Assembled on 3°, 4° or 5° taper.

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Precision machined and drilled, bolted corner construction permits easy insertion of new sides or ends. The entire jacket need not be scrapped. The standard style is for ordinary foundry practice and the grooved style, which permits ready gas escape, is for steel foundries. Assembled on 3°, 4° or 5° taper.

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By EDWIN BREMER

Foundry DEVELOPMENTS

INVESTIGATION of the effect of phosphorus on corrosion resistance of magnesium and some of its alloys by Emley, Jessup and Higgins, as reported in the September issue of the *Journal* of the Institute of Metals (London), led the authors to these conclusions: Corrosion resistance of pure magnesium is reduced by the presence of phosphorus in amounts over about 0.002 per cent, but this effect can be suppressed by addition of manganese. With a normal iron content, the adverse effect of phosphorus is not suppressed by manganese. Phosphorus also exerts a marked adverse effect on the corrosion resistance of high purity Elektron A8 (Al 8, Zn 0.4, Mn 0.25, remainder Mg). Amount of phosphorus that can be introduced into magnesium is much greater in the presence of iron. Phosphorus increases pickup of iron in remelting A8 alloy. Phosphorus is precipitated from magnesium by zirconium, and the corrosion resistance of alloys containing zirconium is unaffected by phosphorus present in the metal used for their preparation.

* * *

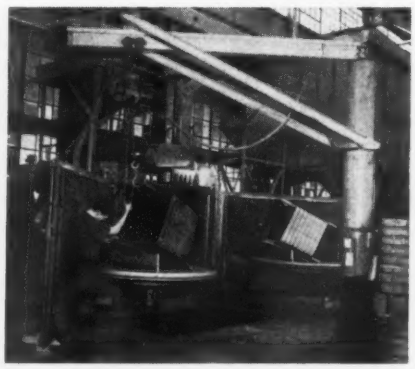
CONCRETE crane and transport runways will be kept clear of snow and ice this winter by application of heating cable at the South Milwaukee, Wis., plant of Bucyrus-Erie Co. Firm installed lead-covered, flexible heating cable made by General Electric Co. 2½ to 3 in. below the surface on 3-in. centers in four concrete runways ranging from 100 to 275 ft long and 10 ft wide, and used 40,000 ft of cable. Step-down transformers supply 180 volts to shortest runway and 500 volts to longest. Last year the cable cleared the runways in a few hours after a week-end snowfall with the outside temperature at 11° below zero.

* * *

WHILE it may have been mentioned before, a reference to grinding of gray iron castings is worth repeating. It appeared in *Grits and Grinds*, published by Norton Co., Worcester, Mass., and states that in grinding it is well to keep in mind that *total* grinding cost and not simply wheel cost should be considered—total grinding cost including wheel cost, labor cost, and overhead charges. Further it points out that a relatively hard, long-lived wheel actually may be a more expensive wheel to use than a softer, somewhat faster wearing, but also definitely faster cutting wheel. In addition, the softer wheel, within limits of good efficiency, reduces fatigue and has a greater earning capacity for the operator. For example, an increase in rate of production (by changing to a softer, faster cutting wheel where present specification is on the hard side of the proper grade) has a greater effect on the total grinding cost than a 20 per cent increase in wheel life from the slower wearing wheel, by reason of the higher rate of production and lower overhead per unit of castings ground.

* * *

TO INCREASE usable lives of its steel tote boxes, Caterpillar Tractor Co., Peoria, Ill., has begun a reconditioning program. Preparatory to repainting the chipped paint and accumulated rust are removed in an airless blast cabinet designed for continuous cleaning by American Wheelabrator & Equipment Corp., Mishawaka, Ind. As shown in the accompanying illustration, the front of the cabinet has two doors, either of which can completely close it. A 66-in. rotating work table is mounted on each door, and as the door is closed the table moves into the blasting zone. When the door is opened the table comes out for reloading. While one table load is under blast the other is being loaded. Blasting unit contains two rotating wheels for throwing the abrasive so that all surfaces are covered. Boxes are blasted in two positions, with one minute's time required in each.



* * *

DURING processing of magnesium alloys preparatory to pouring into the molds, Dow Chemical Co., Bay City, Mich., bubbles chlorine gas through the molten alloy to remove hydrogen as well as other impurities. Chlorine treatment is conducted in the temperature range 1320 to 1400° F, since below 1320° the magnesium chloride formed is solid and does not protect the metal, while above 1400° reaction between magnesium and chlorine causes high melting loss and excessive magnesium chloride. Chlorine gas is bubbled through the alloy as rapidly as possible without splashing for 5 to 15 minutes, and a suitable rate of injection has been found to be at 50 psi. Chlorine is supplied in liquid form in 2000-lb capacity cylinders. Since cylinder pressure depends on temperature of liquid chlorine, and the latter on room temperature and rate of withdrawal, Dow uses a bank of infrared lamps in conjunction with a pressure control unit made by Minneapolis-Honeywell Regulator Co., Industrial Division, Philadelphia 44, to maintain the chlorine gas pressure at 50 psi. When chlorine withdrawal is rapid, especially in cold weather, the control unit energizes the lamps whose heat builds the pressure up to the desired value. Unit switches off lamps when 50 psi is exceeded.

* * *

UNFORTUNATELY, and too often, flammable liquids such as pattern or sand release agents, core and mold washes, etc., which employ gasoline, naphtha, alcohol or other volatile agents as the carrier or vehicle are handled carelessly in the foundry. Safety regulations in general specify that dispensing containers for such liquids be painted red to indicate that the content is flammable and should be handled with care, and the openings of the containers be equipped with tightly fitting enclosures. Best precaution is to use approved containers, and as pointed out by Protectoseal Co., Chicago, those should have self-closing caps, flame or flash arresters, and other safety features. The arresters made of perforated metal with properly constructed seams prevent ignition of the flammable vapor within the container.

Logan Roller Conveyor handles molds to and from rollover machine. "Broken line" in lower right indicates turntable section to serve side line. Another turntable is located beyond the operators and the machine.

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Pressing and straining seldom help win an objective. Let Logan Conveyors cancel out the "effort" on your production lines, increase your output, smooth out the busy day for all hands.

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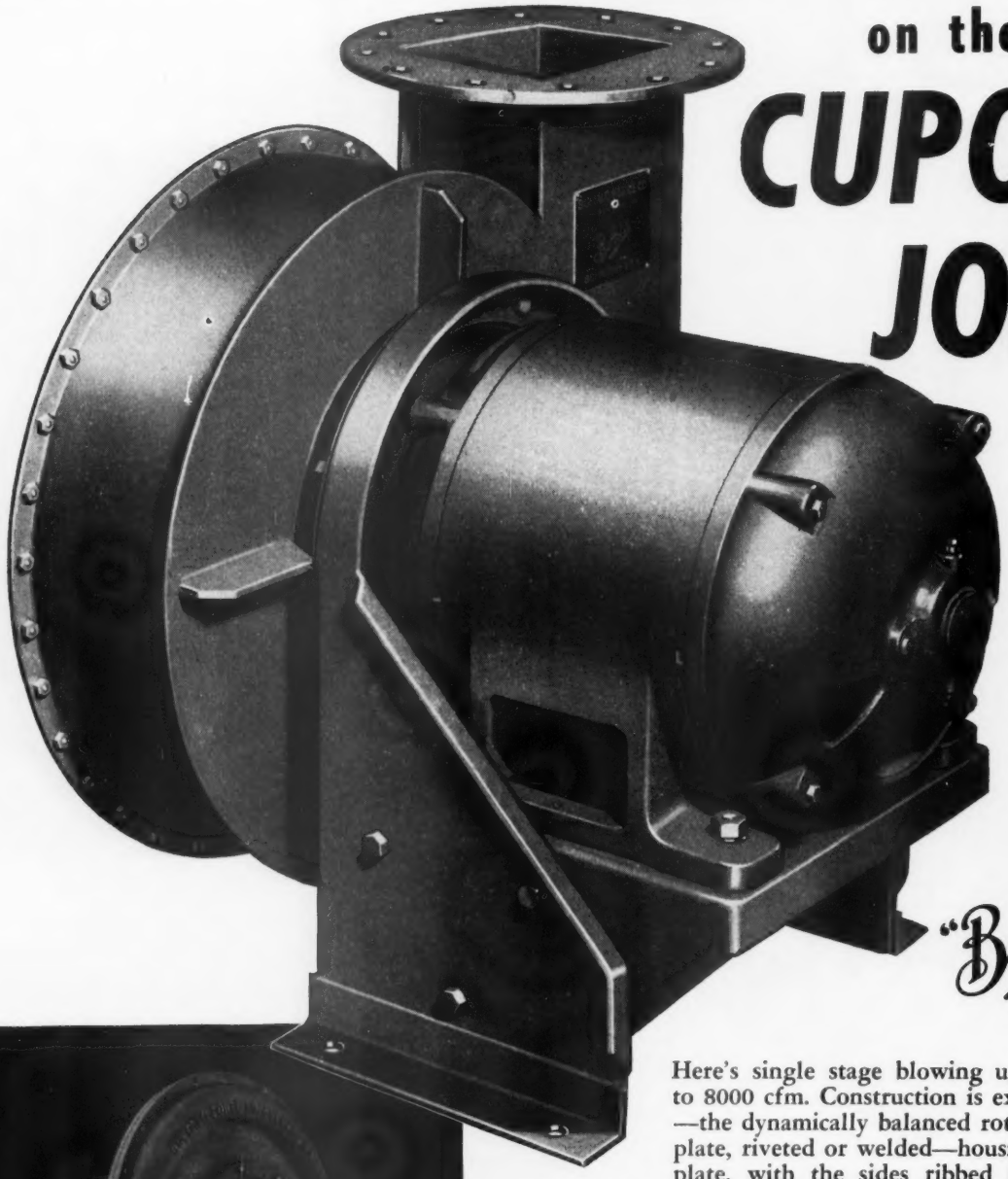

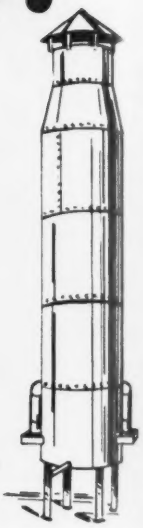

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"CB" Blowers

Here's single stage blowing up to 2¼ lbs., 150 to 8000 cfm. Construction is exceptionally rugged—the dynamically balanced rotors are sturdy steel plate, riveted or welded—housings are heavy steel plate, with the sides ribbed for extra strength. Base is of rigidly braced construction. WRITE FOR COMPLETE SIZE RANGE AND DATA—Bulletin 3553-A.

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This line of blowers-exhausters gives constant operating characteristics over a wide range of capacities. Many sizes up to 5500 cfm. and pressures up to 55.2" of water. Rugged cast iron housings. WRITE FOR BULLETIN 3014-C. There is a "Buffalo" Blower in the right size and pressure rating for lowest cost in *your* cupola requirements.

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Tentative Specifications for

GRAY IRON CASTINGS FOR PRESSURE-CONTAINING PARTS FOR TEMPERATURES UP TO 650 F

ASTM Designation: A 278—51 T

Issued, 1944; Revised, 1949, 1951.

(Concluded from October issue)

(Note) of 3.8 per cent. Alloys may be used to facilitate the development of mechanical properties, or stabilize the structure at elevated temperatures, or both (Note 10).

NOTE.—The carbon content equivalent is calculated as follows: Total Carbon + 0.3 (Silicon + Phosphorus).

(b) The embrittling impurities in the classes Nos. 40, 50 and 60 irons shall be held to the following maximum limits:

Phosphorus, max, per cent	0.25
Sulfur, max, per cent	0.12

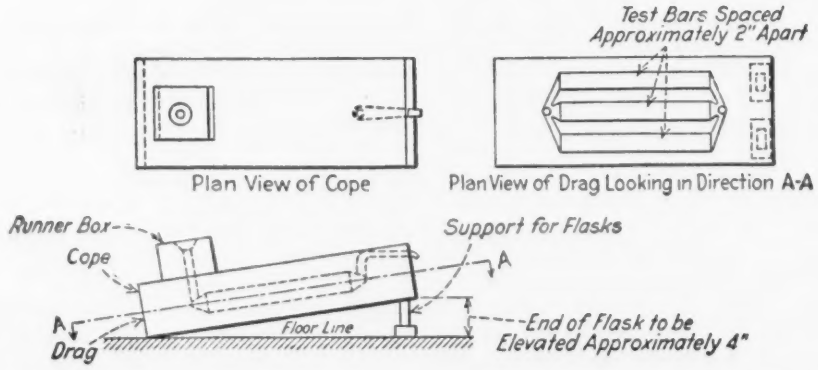

Fig. 4—Test Bar Cast on Incline. Arrangement of Flasks for Casting Test Bars

Marking

9. Pressure-containing castings made in accordance with these specifications shall have the name of the manufacturer, or his recognized trade-mark, and the class of iron to which it conforms, cast or indelibly stamped on a surface indicated by the purchaser or in such a position as not to injure the usefulness of the casting.

Workmanship and Finish

10. (a) The castings shall be true to drawing and free from injurious defects. The surface of the castings shall be free from burnt-on sand and reasonably smooth. Risers, fins and projections used to facilitate the making of the casting shall be removed. In other respects, they shall conform to

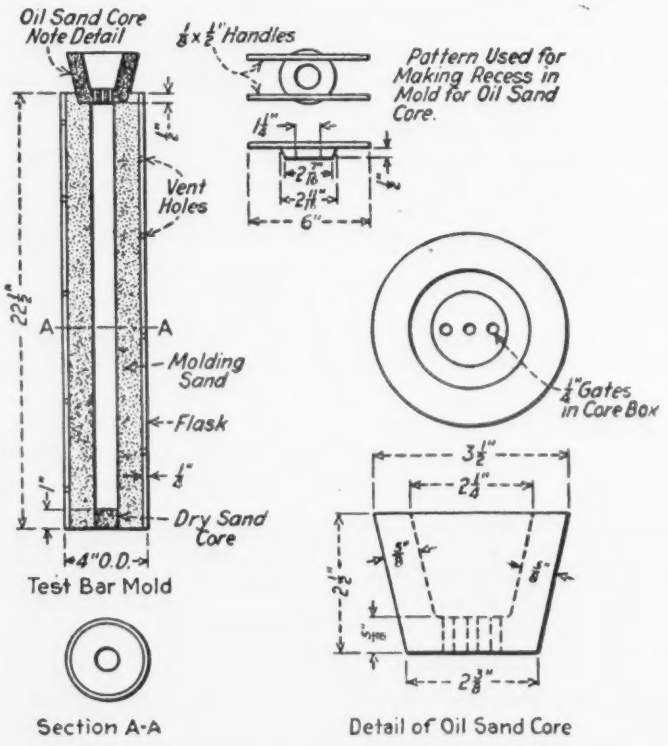

Fig. 5—Typical Test Bar Cast Vertically

Tentative Specifications for

GRAY IRON CASTINGS FOR PRESSURE-CONTAINING PARTS FOR TEMPERATURES UP TO 650 F

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whatever requirements may be especially agreed upon between the manufacturer and purchaser.

(b) Surface imperfections not exceeding 20 per cent of the thickness of the section, seepage around chaplets or from other minor defects may be repaired by plugging, provided the diameter of the plug does not exceed its thickness, and provided a radiographic inspection over the extent of the defect shows that the surrounding metal is sound. Castings showing a major leak under the specified pressure test shall be rejected.

Inspection

11. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works that concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

Certification

12. Upon request of the purchaser, the manufacturer shall be prepared to certify that his product conforms to the requirements of these specifications.

Explanatory Notes

Note 1.—Cast irons, classes Nos. 40, 50, and 60, would be considered high-strength irons, particularly in medium and heavy sections.

Note 2.—The higher-strength irons are usually more expensive to produce because of the following:

(a) Special melting methods,
(b) Possible use of expensive alloys,
(c) Changed practice in molding and pouring, and
(d) Improved technique and supervision.

Note 3.—In general, the higher-strength irons are more difficult to machine, also more difficult to produce in heavy sections. Consequently, specifying a stronger cast iron than is needed may result in unnecessarily increased costs in producing the casting and in machining.

Note 4.—The cooling rate of the casting may be approximated by selecting a test block with the same surface-to-volume ratio. For example, the 1.2-in. diameter B-bar would represent a 1.2-in. round or 0.6-in. thick plate.

Note 5.—Test bars shall be plain, cylindrical shapes as shown in Fig. 1. Where bars are cast on end, allowance for draft may be made. However, the diameter at the center of the length shall correspond to the nominal diameter, within the following permissible variations:

Test Bar	Permissible Variations, in.
A	±0.05
B	±0.10
C	±0.10

Tension test specimens "cast to size" are not recognized in these specifications.

Note 6.—When the controlling section is very heavy in comparison to other sections of the casting and if maximum strength is sought in the controlling section, it is possible that chilled spots may be found in the light sections. In such cases it may be necessary to (1) use a lower strength class for the controlling section, or (2) modify the design to provide more section uniformity.

Note 7.—A sound test bar is desired. Several methods of making test bars are shown in Figs. 3, 4, and 5. All of these methods of casting have been used and found to produce satisfactory results.

Note 8.—Test bars shall not be cleaned by tumbling unless the castings are so cleaned, or unless agreed upon by the manufacturer and the purchaser.

Note 9.—The use of ball and socket holders in the tensile strength test is recommended. Tests made under conditions where eccentric loadings may occur will give erroneous results.

Note 10.—The alloying elements commonly added to cast iron to improve its properties include chromium, copper, molybdenum, nickel and vanadium. Any combination of the above alloying elements which will assist in stabilizing the structure or retain strength at elevated temperatures may be used.

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Snagging Wheels . . . Cut-off Wheels . . . Raised Hub Disc-Wheels . . . Cones . . . Mounted Points . . . Core Files . . . All BAY STATE products for FOUNDRY use are rugged . . . fast-cutting . . . extra safe.

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Top Performance Consistently Duplicated

DOES BETTER CONDITIONED SAND MEAN BETTER CASTINGS TO YOU?

This drag scoops the sand from the floor and eliminates any layer of unconditioned sand

This Moulders' Friend was rolled off a truck on to the floor of a North Carolina foundry where it conditioned all of the molding sand without any rearrangement of the heaps. The Moulders' Friend will fit your foundry too.

THE MOULDER'S FRIEND GIVES YOU THOROUGHLY CONDITIONED SAND

The thousands of flat tempered steel wires in the brush revolving at high speed pick up small particles of used sand, added bond and moisture and blend them thoroughly. This process is so thorough that either clay bond or new moulding sand is blended with the heap successfully and a minimum of moisture is required. A portable screen and water dispenser are valuable added features.

THE BRUSH DOES THE JOB

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THE MOULDER'S FRIEND SAVES MONEY . . .

capacity over one ton per minute—one man operation—simple construction—easy to buy and use—pays for itself with better castings and labor saved.

Investigate The Moulders' Friend today. See one in operation.

"The Moulders' Friend"
Dallas City, Illinois

Making a Large Casting

ABC of Foundry Practice

By PAT DWYER, *Engineering Editor, FOUNDRY*

SEVERAL years ago a widely circulated magazine published a story in which the hero performed the "incredible" feat of making a 125-ton cast iron base for a press. Through one of his characters, the author claimed in the early part of the story that the job was impossible.

"No gray iron foundry in the world," said he, "can melt that much iron. Furthermore, if a foundry could melt that much iron and pour it into a mold, no railroad in the country could transport the casting from the foundry to its ultimate destination."

Rated on its merits as a piece of fiction, the story was an excellent presentation of the standard short-story formula. The technical error it contained was that the author did not s t r e t c h his imagination far enough. If he had added an 0 to the 125 and made the weight 1250 tons, he would have pleased the majority of his readers, and would not have excited the ridicule of men with foundry experience.

All In Day's Work

Demand for gray iron castings weighing 125 tons is not as brisk and general as that for motor blocks, pipes, car wheels or flat irons. Nevertheless, castings weighing 125 tons and more have been made, not as pieces of spectacular achievement, but as part of the regular day's work. Consider, for example, an instance where 145 tons of iron were melted and poured into an anvil base casting, shipping weight 130 tons. Except for the large amount of metal involved and the incidental manipulation of cranes and ladles, the molding and casting of the large anvil block presented no more difficulty than the production of many similar, but smaller, castings made at frequent intervals.

One of the concrete-walled pits, 10 x 20 ft, was cleaned out to a depth of approximately 8 ft and a substantial coke bed was laid on the bottom. Lengths of 6-in.-diam steel pipe were erected along the sides and ends in the usual manner to provide an exit for the gas and steam generated when the mold was filled with molten iron. A 6-in. thickness of sand was rammed on top of the coke bed and a flooring of brick on edge was laid on the sand. The brick floor extended beyond the size limits of the casting at the sides and ends to form a foundation for the vertical walls, 12 in. thick. Spaces between the bricks were filled with fine coke and then a coating of loam was applied and swept off flat and level with the aid of one transverse and two parallel straightedges. After the loam had stiffened the pattern was lowered into place on the prepared bed.

The pattern, a plain rectangular wooden box with sufficient bracing on the inside to hold it in shape and permit handling, measured 6 x 7 x 8 ft, or a little more than half the length of the proposed casting. After one complete end and part of the two side walls had been built, the pattern was lifted out, turned end for end and lowered again on the prepared bed according to measurement. The inner end was guided into proper place by the unfinished ends of the vertical side walls. The second end wall and the remainder of the two unfinished side walls then were built up flush with the top of the pattern. Dry sand cores were built into the side and end walls at several points to form trunnions for handling the casting with the cranes.

Dry sand cores, with gate openings 1 x 4-in., were built into the wall near the center at one side. Commencing near the bottom and extending about 6 in. apart, four rows of gates, three in a row, were designed to introduce enough metal to fill the mold to a depth of about 6 in. Remainder of the metal, referred to later, entered the mold through a multiplicity of 1½-in. pop gates fed by a large runner basin on top of the cope. Size, distribution and number of gates were designed to deliver metal into the mold at the rate of approximately 15 tons per minute. In this particular instance the actual pouring time was 8½ minutes. Iron was tapped at a temperature close to 2800° F. Despite the time required for filling the six ladles, the metal was poured at a temperature between 2450 and 2550° F. The metal was melted simultaneously in three cupolas at the rate of 45 tons per hour.

Bars in the cope were arranged to leave an opening 3-ft square in the center. A dry sand slab core, 4 in. thick with a central opening 20 in. diam, was placed in the bottom of this space. A box pattern 28 in. square was placed around the opening. Sand was rammed around it to form a feeding riser approximately 5 ft high. Three weeks later when the casting was stripped, a skilled craneman swinging a heavy weight knocked the riser from the casting to leave a comparatively shallow stump in the neck area formed by the dry sand slab core.

After the pattern was removed from the mold, the loam facing was finished and a coat of wet blacking was applied to the surface. The cope was replaced and a special gas burner unit forced hot air at a temperature of 500° F into the mold for a period of 24 hours. With the mold finally closed, plates in contact with the outside of the side and end walls were braced from the concrete walls of the pit. Sand was rammed firmly in the open space all around the mold and up to the floor level. After the pouring basin was made up, long binder bars, ends resting on blocks on the side walls of the pit, were placed in position, and a number of large weights were placed on the binder bars to resist pressure against the face of the cope. Suitable blocks and wedges were inserted between the bottom face of the binder bars and the top of the cope.

Eight Ladles Used

With one crane over the center of the mold, the longitudinal runner basins had to be extended several feet beyond the mold at each end to permit the remaining two cranes in the main bay to approach near enough to handle their respective ladles. A long transverse runner basin extended into the side bay of the foundry to receive metal from two ladles suspended from two cranes in that department. Eight ladles were required to pour metal into the mold.

At the beginning, one ladle was suspended from each of the three cranes while three other ladles rested on the floor in the main bay. One ladle was partly emptied through the ingates on one side of the mold to provide a cushion of metal in the bottom of the mold. Then the ladles at each end of the mold kept the main pouring basin filled by pouring alternately. As each ladle was emptied it was placed on the floor. All pouring ceased when the metal appeared in the central riser. When the

metal had solidified in the small pop gates, a ladle was brought from the cupola to fill the riser to the top with fresh, hot metal. The top surface was covered with charcoal and no further attention was paid until the following afternoon when additional iron was poured in at the top of the riser to compensate for the amount absorbed by the casting. A fresh layer of charcoal was placed on top of the riser to complete the job.

Several large riser blocks from anvil bases and die blocks produced over a period of many years are utilized as cope weights by drilling holes in opposite sides for the reception of loose steel pins. The majority are sold as scrap to companies operating open hearth steel furnaces where the blocks may be charged as single units. Cost of reducing them to cupola charging size prohibits their use in the foundry.

PLANS PROGRESSING FOR AFS 1952 CONVENTION

PRELIMINARY plans are well advanced for the 1952 International Foundry Congress to be sponsored by the American Foundrymen's Society at Atlantic City, May 1 through 7. As indicated by the accompanying tentative program, a full schedule of events is planned throughout the seven days.

Departing from recent custom, the congress will open on Thursday, continuing through the following Wednesday. The Foundry Show exhibits of equipment and supplies will be conducted throughout the week on the main floor of Atlantic City's mammoth Convention Hall. Technical sessions are scheduled for all days except Sunday, and likewise will be held at the hall, which will be headquarters for the congress.

Sunday, May 4, will be "International Day" and the day's program will include a reception for the many overseas guests expected to be present, as well as a meeting of the International Committee of Foundry Technical Associations. Annual business meeting of the AFS, the Hoyt Annual Lecture and the annual banquet are to be held on Saturday.

The schedule of technical sessions will follow the pattern of recent AFS conventions in that meetings of the light metals and brass and bronze divisions will be held the early part of the seven days; malleable iron, patternmaking and general interest subjects will be treated the middle of the week, while gray iron and steel sessions are scheduled for the latter part of the congress. Shop courses will be conducted in the late afternoons instead of in the evenings as formerly.

TENTATIVE CONGRESS PROGRAM

Thursday, May 1—"Defense Day"

8:30 a.m.—Registration opens
9:30 a.m.—Exhibits open
11:45 a.m.—Official opening ceremony
12:30 p.m.—Roundtable luncheon meeting—Brass and Bronze
12:30 p.m.—Defense Production luncheon meeting—Nonferrous
2 p.m.—Technical session — Aluminum and Magnesium
2 p.m.—Brass and Bronze Division business meeting
4 p.m.—Technical sessions — Aluminum and Magnesium; Brass and Bronze; Nonferrous Sand Shop Course; Nonferrous Shop Course
5:30 p.m.—Registration and exhibits close

Friday, May 2—"Chapter Day"

9 a.m.—Registration and exhibits open
9:30 a.m.—Buses leave for plant visitations
10 a.m.—Technical sessions—Brass and Bronze, Aluminum and Magnesium, Patternmaking, Sand
12 noon—Roundtable luncheon meetings—Aluminum and Magnesium, Patternmaking
2 p.m.—Technical session—Malleable
2 p.m.—Aluminum and Magnesium Division business meeting; Pattern Division business meeting
4 p.m.—Technical sessions—Nonferrous Sand Shop Course; Nonferrous Shop Course
5:30 p.m.—Registration closes
7 p.m.—Chapter Officers and Directors dinner
9:30 p.m.—Exhibits close

Saturday, May 3—"President's Day"

9 a.m.—Registration opens
10 a.m.—57th Annual Business Meeting of AFS—Election of officers and directors; apprentice contest awards; welcome to international delegates
11 a.m.—Charles Edgar Hoyt annual lecture
12 noon—Exhibits open
12 noon—President's luncheon for National Castings Council
2 p.m.—Technical sessions—Brass and Bronze, Aluminum and Magnesium, Patternmaking, In-Plant Training
4 p.m.—Technical sessions—Malleable Iron, Nonferrous Plant and Plant Equipment, Nonferrous Safety and Hygiene and Air Pollution
4 p.m.—International Dictionary Committee
5:30 p.m.—Registrations and exhibits close
7:30 p.m.—Annual AFS Banquet—Gold medal awards; presentation of International prize; entertainment

Sunday, May 4—"International Day"

9 a.m.—Registration opens
10 a.m.—Exhibits open
10 a.m.—Committee meetings including International Committee on Testing Cast Iron; International Committee of Foundry Defects
2 p.m.—Committee meetings, including International Committee of Foundry Technical Associations
4:30 p.m.—International reception
5:30 p.m.—Registration closes
6:30 p.m.—Exhibits close
7 p.m.—President's dinner (private)
7 p.m.—United Kingdom dinner (tentative)

Monday, May 5—"Management Day"

9 a.m.—Registration and exhibits open
9 a.m.—Past Presidents' breakfast (private)
10 a.m.—Technical sessions—Gray Iron, Steel, Safety and Hygiene, Time Study and Methods, Malleable Iron, Sand
10 a.m.—Annual meeting, National Castings Council (tentative)
10 a.m.—Annual meeting, Foundry Educational Foundation Trustees (tentative)
12 noon—Roundtable luncheon meeting—Malleable Iron
12 noon—Defense Production luncheon meeting—Ferrous
2 p.m.—Technical sessions—Chapter Educational Activities; Ferrous Safety and Hygiene and Air Pollution
2 p.m.—Malleable Division business meeting; Sand Division business meeting
4 p.m.—Technical sessions—Gray Iron Shop Course, Ferrous Sand Shop Course, Education, Costs
5:30 p.m.—Registrations and exhibits close
7 p.m.—Alumni dinner (private)

Tuesday, May 6—"Old Timers Day"

9 a.m.—Registration and exhibits open
9:30 a.m.—Buses leave for plant visitations
10 a.m.—Technical sessions—Gray Iron, Heat Transfer, Costs, Education
10 a.m.—Old Timers' molding contest
12 noon—Roundtable luncheon meeting—Gray Iron
12 noon—Equipment and Supplies luncheon meeting (tentative)
2 p.m.—Technical sessions—Steel, Time Study and Methods, Refractories
2 p.m.—Gray Iron Division business meeting
4 p.m.—Technical sessions—Gray Iron Shop Course, Ferrous Sand Shop Course
5:30 p.m.—Registrations and exhibits close
6:30 p.m.—International Education dinner (tentative)

Wednesday, May 7—"Exhibitors' Day"

9 a.m.—Registration and exhibits open
10 a.m.—Technical sessions—Gray Iron, Steel, Sand, Ferrous Plant and Plant Equipment
11 a.m.—Exhibitor Recognition and Award
12 noon—Roundtable luncheon meeting—Steel
12 noon—Presidents' luncheon for Foundry Equipment Manufacturers' Association and Foundry Facing Manufacturers' Association Officials
2 p.m.—Steel Division business meeting
3 p.m.—Registration closes
4 p.m.—Exhibits close

Atlantic City's Convention Hall will be center of activities at International Foundry Congress, May 1-7

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How VANADIUM improves engineering steels and helps conserve critical alloys

In these critical times when many alloying materials are scarce, you may be able to use vanadium to good advantage. Steels alloyed with vanadium meet most of the mechanical specifications for low-alloy engineering and structural steels. In fact, vanadium can often be used in engineering steels to replace at least part, if not all, of certain alloys now in critical supply.

The metallurgy of vanadium is well known. Small additions of vanadium—0.10 to 0.30 per cent—can be used effectively to give steel extra strength, toughness, and resistance to fatigue and wear. It improves engineering steels by increasing their yield strength without sacrificing ductility. The uniformly fine grain size of vanadium-bearing steels makes them tough and resistant to abrasion, fatigue, and impact.

Better Mechanical Properties

In the following table are typical analyses for carbon-vanadium and chromium-vanadium steels that are suitable for most applications where low-alloy, high-strength steels are required. The carbon-vanadium steel is compared with plain-carbon steel; and the chromium-vanadium steel, with chromium-molybdenum steel. Note the excellent properties of the vanadium-bearing steels.

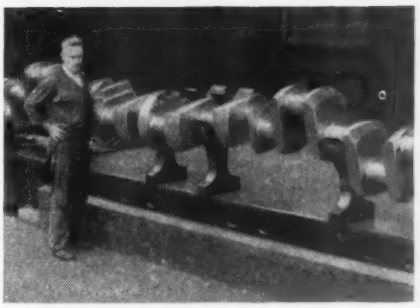


Fig. 1 — Vanadium increases the strength, toughness, and wear resistance of engineering steels for many machine parts, such as this large crankshaft.

Improves Cast Iron

A small addition of vanadium, usually from 0.10 to 0.25 per cent, refines the grain of cast iron, and materially increases its strength and hardness. Moreover, vanadium may be used in cast iron to replace at least part, if not all, of certain alloys that are now in short supply.

Vanadium in Rimmed Steel

An addition of approximately 1 lb. of vanadium per ton of steel produces non-aging characteristics in a rimmed steel. These non-aging properties, together with improved deep-drawing characteristics and the good surface inherent in rimmed steels, make these steels of particular interest at the present time.

Grades of Ferrovanadium

ELECTROMET produces ferrovanadium containing 50 to 55 per cent vanadium for the production of vanadium-bearing steels and irons. The alloy is produced in three grades with maximum 0.20, 0.50, or 3.00 per cent carbon and maximum 1.50, 2.00, and 8.00 per cent silicon, respectively. Each grade is specially adapted to fill the different requirements of iron- and steel-making.

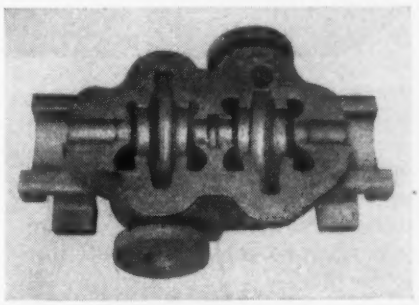


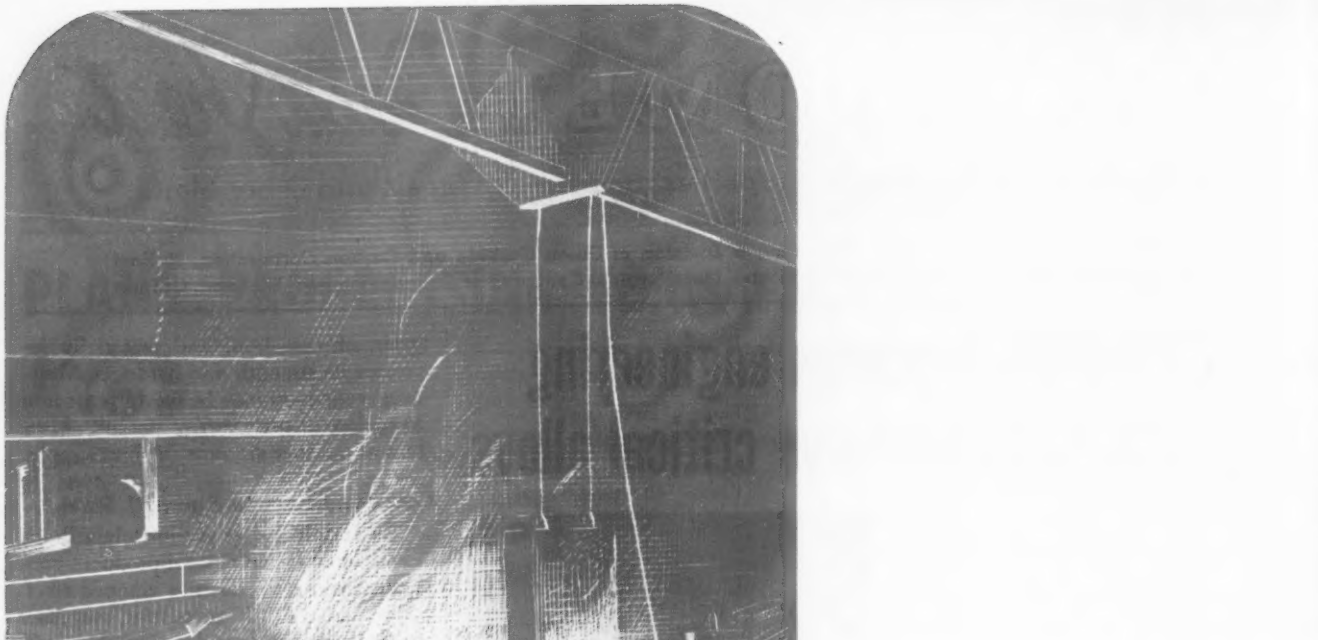
Fig. 2—Steel and iron castings treated with small additions of vanadium have high ductility and greater toughness and impact resistance.

Write for a copy of the booklet, "ELECTROMET Products and Service," which gives helpful information about the use of ferrovanadium and other alloying metals that ELECTROMET supplies. The booklet may be obtained from any ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

Properties of Vanadium Steels Compared With Other Engineering Steels

Typical Analysis, %	Carbon Steel	Carbon-Vanadium Steel	Chromium-Molybdenum Steel	Chromium-Vanadium Steel
Vanadium	—	0.16	—	0.16
Carbon	0.50	0.49	0.50	0.50
Manganese	0.71	0.77	0.80	0.79
Silicon	0.19	0.15	0.30	0.31
Chromium	—	—	0.95	0.98
Molybdenum	—	—	0.20	—
Annealed and Furnace-Cooled				
Tensile Strength, psi	90,600	100,000	100,000	99,500
Yield Point, psi	48,900	66,000	50,000	64,100
Elongation in 2 in., %	23.3	25.0	23.0	28.4
Reduction of Area, %	37.8	49.1	45.0	59.0
Izod Impact, ft.-lb.	13.5	26.0	17.0	44.0
Quenched and Tempered				
Tensile Strength, psi	134,900	134,500	232,000	232,800
Yield Point, psi	110,800	128,000	214,500	224,200
Elongation in 2 in., %	18.3	18.3	10.0	10.4
Reduction of Area, %	54.1	56.6	39.0	43.1
Izod Impact, ft.-lb.	54.0	65.0	12.0	12.0

The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.



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Activities of Foundry

GROUPS

Southern California

FOURTEENTH annual summer outing of Southern California Chapter of the AFS was held at the Lakewood Country Club, Long Beach, Calif., on Aug. 11. Golf, baseball, horseshoes and a barbecue occupied the 380 members and their guests during the day and evening. After dinner a program of professional entertainment was presented. Excellence of the affair is attributable to the extended efforts of the entertainment committee which has as its chairman William C. Baud, Mechanical Foundries Division, Ford Machinery Corp.

First meeting of the 1951-52 season was held Sept. 14 at Rodger Young Auditorium, Los Angeles. Featured speaker was Warner B. Bishop, Archer-Daniels-Midland Co., Cleveland. His subject was "Foundry Core Binders—Their Characteristics and Use." Supplementing Mr. Bishop's talk was a motion picture entitled, "The ADM of Cores." This comprised a study of coreroom control and techniques, and explained the various causes of core failures.

Emphasized was the importance of the control needed over oil and sand, and the need for careful inspection of cores to ascertain in advance what troubles or defects exist, so that future core runs will do the job that they were designed to do.—*Alfred A. Grant III, Grant & Co.*

Lancaster—York

INITIAL meeting of the 1951-52 season of the Conestoga Foundrymen's Association was held Sept. 20 at Wiggins Restaurant, Lancaster, Pa. Chairman W. T. Sheffield, Hershey Machine & Foundry Co., Manheim, Pa., introduced G. H. Bradshaw, Philadelphia Naval Shipyard, and chairman of Philadelphia Chapter of the AFS, who urged the nonferrous members to attend the educational program being sponsored by the Philadelphia Chapter.

A roundtable discussion featured the meeting. Charles Mooney, Olney Foundry Co., Philadelphia, was discussion leader for the ferrous group. The subject was common casting defects. Causes of defects were tabulated, then the best means of eliminating them were discussed. Group leader, R. J. Keeley, Ajax Metal Co., Philadelphia and the nonferrous foundrymen discussed "rough top" ingots versus "smooth top" ingots and synthetic sands versus natural bonded sand in the manufacture of brass and bronze castings.—*M. E. Mohr, Hershey Machine & Foundry Co.*

Chesapeake

PLANT visits to the T. B. Wood Sons Co. and Chambersburg Engineering Co., Chambersburg, Pa., by the members of the Chesapeake Chapter of AFS opened the year's activities, Sept. 21. Guests also were present from the Conestoga Foundrymen's Association.

After dinner at Piney Mountain Inn, Chambersburg, Allen Kittrell, Leach Pattern Shop, Baltimore, and chapter chairman, introduced W. W. Maloney, secretary-treasurer of the AFS, who briefed the group on the 1952 convention to be held in Atlantic City, N. J. I. R. Wagner, Electric Steel Casting Co., Indianapolis, national vice president, presented the coffee talk and stressed the need for a program on foundry safety and hygiene.

Douglas Galloway, foundry superintendent at Chambersburg Engineering Co., was technical speaker of the meeting on the subject "Why and How of Cement Molding." Mr. Galloway outlined such advantages of cement molding as improved surface finish, greater mold accuracy, reduced shrinkage trouble and minimum cleaning problems. At his foundry, a silica sand is mixed with about 11 per cent cement and sufficient water. This is used for facing sand and seacoal is

(*Continued on page* 173)

SOUTHERN CALIFORNIA Chapter of the AFS held its first meeting of the season Sept. 14 at Rodger Young Auditorium, Los Angeles. At left is Henry W. Howell, Howell Foundry Co., chapter president. Left to right, in lower left view are: Harold C. Pagenkopp, Angelus Pattern Works, chapter vice president, and Warner B. Bishop, Archer-Daniels-Midland Co., speaker of the evening. A few of the 112 foundrymen and guests attending the meeting are shown at lower right. Photos by courtesy of Ken Sheckler, Calmo Engineering Co.

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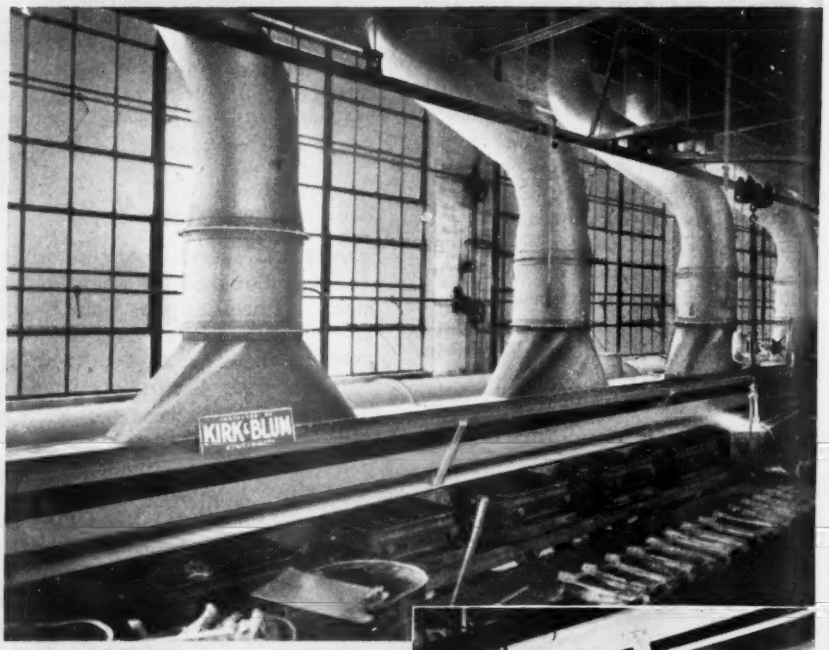
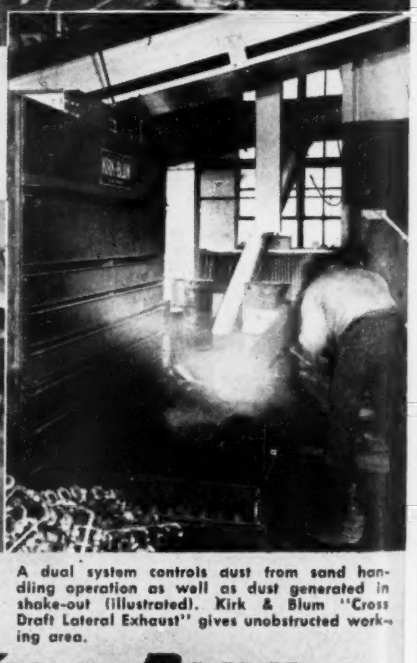
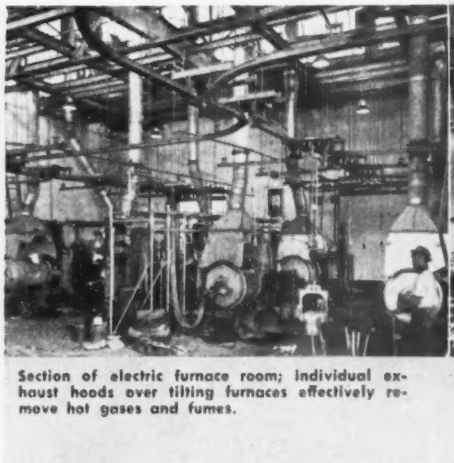


Filled ladles, brought to this section of the pouring station by overhead conveyor, are poured by operators standing on a "floor" moving with the flask conveyor. The continuous slotted Kirk & Blum hood collects fumes over the entire length of the pouring station.



A dual system controls dust from sand handling operation as well as dust generated in shake-out (illustrated). Kirk & Blum "Cross Draft Lateral Exhaust" gives unobstructed working area.



Section of electric furnace room; individual exhaust hoods over tilting furnaces effectively remove hot gases and fumes.

Battery of double grinders; note placement of exhaust headers in unused ceiling space. All exhaust equipment is located outside building, conserving floor space.

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KIRK AND BLUM
DUST CONTROL SYSTEMS

(*Continued from page* 171)

added for heavy-sectioned castings. The mold surface is always washed with a coating of coke base blacking and thoroughly dried. No artificial drying is required for either the cores or the molds because of the cement base. The speaker did point out that cement molding would not be practical in a mass production shop producing smaller castings because of the drying time required and the fact that mold pressures are less.—*Joe Danko Jr., Arlington Bronze & Aluminum Corp.*

Reading

SEPT. 18 meeting of the Reading Foundrymen's Association, held at the Berkshire Hotel, Reading, featured E. C. Troy, foundry engineer, Palmyra, N. J., who spoke on "What's Wrong with the Foundry?"

Mr. Troy believes foundrymen should co-operate in organizations and research whose purpose is to advance the industry. One reaps from these functions what effort he has put forth. He also stressed the need for training supervisory personnel. In addition to tools for the workers, environment can be made more pleasant. A clean foundry induces clean and safe working habits. Safety is a problem that should be watched at all times for the good of both worker and management. He also recommended an accurate cost system to show the limitations of small or large castings. Generally the relationship between foundry and customer is good. However, one policy Mr. Troy recommended as one of the best is the delivery of quality castings at the agreed time.—*Joseph L. Grenko.*

Quad City

MORE than 125 interested foundrymen were present at the Sept. 17 meeting of Quad City Chapter of AFS which featured a discussion on "The Effect of Mold Materials on Apparent Metal Shrinkage," by Clyde A. Sanders, vice president, American Colloid Co., Chicago. The meeting was held at the Fort Armstrong Hotel, Rock Island, Ill.

The speaker explained how various additives to molding sands can cause deformation of the mold, and in turn produce apparent metal shrinkage. An interesting discussion period followed his presentation.

George Golson of the *Moline Dispatch* presented the coffee talk and showed colored slides of his recent trip up the Alcan highway to Fairbanks, Alaska.—*Eric Welander, Union Malleable Iron Co.*

New England

NEW England Foundrymen's Association held its first fall meeting Sept. 12 at the Boston Engineers Club with 126 members and guests present.

Following dinner, President Robert E. Walker introduced O. Jay Myers, foundry technical research director, Archer-Daniels-Midland Co., Minneapolis, whose subject was "Cores—Sands—Binders."

The speaker conceded that his subject was one of many variables; however, he did stress the fact that the heart of a casting is its core and that to have good cores we must have control of the material used and their production method. Mr. Myers illustrated his presentation with interesting and educational pictures of the newest laboratory mixing, testing and control instruments and equipment. Charts were shown indicative of the valuable information that can be compiled with these facilities.

It is important that we in the foundry know more about what constitutes the cores we use. Mr. Myers stressed the necessity of having foundry laboratories constantly check the

(*Continued on page* 176)

CENTRAL INDIANA Chapter of the AFS held its annual picnic Sept. 15 with more than 300 members and guests participating. The full day's activities included golf, softball, horseshoe pitching, and a Smorgasbord dinner. Photos by courtesy of Henry O. Yeager, International Harvester Co.

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(*Continued from page* 173)

many possible variables in coremaking. He discussed the importance of checking the screen analysis, grain size, shape and distribution of the sand; clay and other mineral composition of the sand; binders; moisture; mixing procedures and bakeability.

Next meeting of the association will be held Nov. 14. The subject to be considered, "Casting Defects."—*Myron DeHollander, General Electric Co.*

Northern California

OPENING meeting of the season for the Northern California Chapter of AFS was well attended. The meeting was held at Hotel Shattuck, Berkeley, Calif., Sept. 17, with Phil Rodger, General Metals Corp., chapter president, presiding. Warner B. Bishop, manager of the Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, presented a paper entitled "Foundry Core Binders, Their Characteristics and Uses." His talk was supplemented by the motion picture, "The ADM of Cores," which showed many of the problems common to all corerooms and suggested methods to correct them.

A complete research program properly controlled by the foundry personnel was suggested to arrive at suitable core sand mixtures and obtain uniform results. Such a program would permit thorough analysis of the core sand being received from the supplier, and proper adjustment of the sand, water and oil ratio determined to eliminate questionable results in the coreroom.—*John Bermingham, E. F. Houghton Co.*

New Jersey

OFFICERS of the New Jersey Foundrymen's Association were recently re-elected, with H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J., as president; A. E. Winstead, Moore Bros. Co., Elizabeth, N. J., vice president; W. H. Mantz, Irvington, N. J., treasurer, and John L. Carter, Montclair, N. J., secretary.

Election followed the first fall meeting of the association, Sept. 17, at Military Park Hotel, Newark, N. J., at which Edward Metzger, chief, Castings Section, Office of Price Stabilization, Washington, was the featured speaker. He discussed various phases of the pricing regulations which was scheduled to go into effect Oct. 26.

Following were elected directors for a three-year term: J. Forrest Campbell, Campbell Foundry Co., Harrison, N. J.; Mr. Edinger, M. J. Hogan, Bierman-Everett Foundry Co., Irvington, N. J.; A. E. Winstead, and Gardner Van Duyne, Meeker Foundry Co., Newark, N. J.—*Ben K. Price*

Chicago

ACTIVITIES of the Chicago Chapter, AFS, for the 1951-52 season were initiated with a general meeting, Oct. 1, at the Chicago Bar Association. Attendance was approximately 135 members and guests. Speaker for the occasion was Hon. Warren L. Wood, Plainfield, Ill., speaker, Illinois House of Representatives, Chapter President Walter W. Moore, works manager, Burnside Steel Foundry Co., presided.

CHICAGO Chapter of the AFS heard a talk by Warren L. Wood, Illinois House of Representatives, at its October meeting. Shown above, left to right, are: John Owen, Harbison-Walker Refractories Co., chapter vice chairman; Walter Moore, Burnside Steel Foundry Co., chapter chairman, and Mr. Wood. Photo by courtesy of Dean Van Order, Burnside Steel Foundry Co.

Chapter Vice President John H. Owen, Chicago district sales manager Harbison-Walker Refractories Co., who by virtue of his office heads the Program Committee, announced that the member survey conducted in early summer indicated an even choice between general and roundtable meetings. Therefore, the two types will alternate on successive months during the season. In recent years, roundtables have predominated over general meetings in the ratio of about two to one.

Mr. Owen introduced Leroy E. Taylor, service engineer, Goebig Mineral Supply Co., who in turn presented the guest speaker. Representative Wood spoke on politics in their broad sense and the responsibility every citizen should bear in selecting officials and keeping in touch with them concerning their actions. He contended that maintenance of good local government will in the end be reflected in better county, state and national governments. Apathy of voters, he insisted, is the cause of poor government.

Next chapter meeting on Nov. 5 will feature several roundtable discussions.—*Erle F. Ross.*

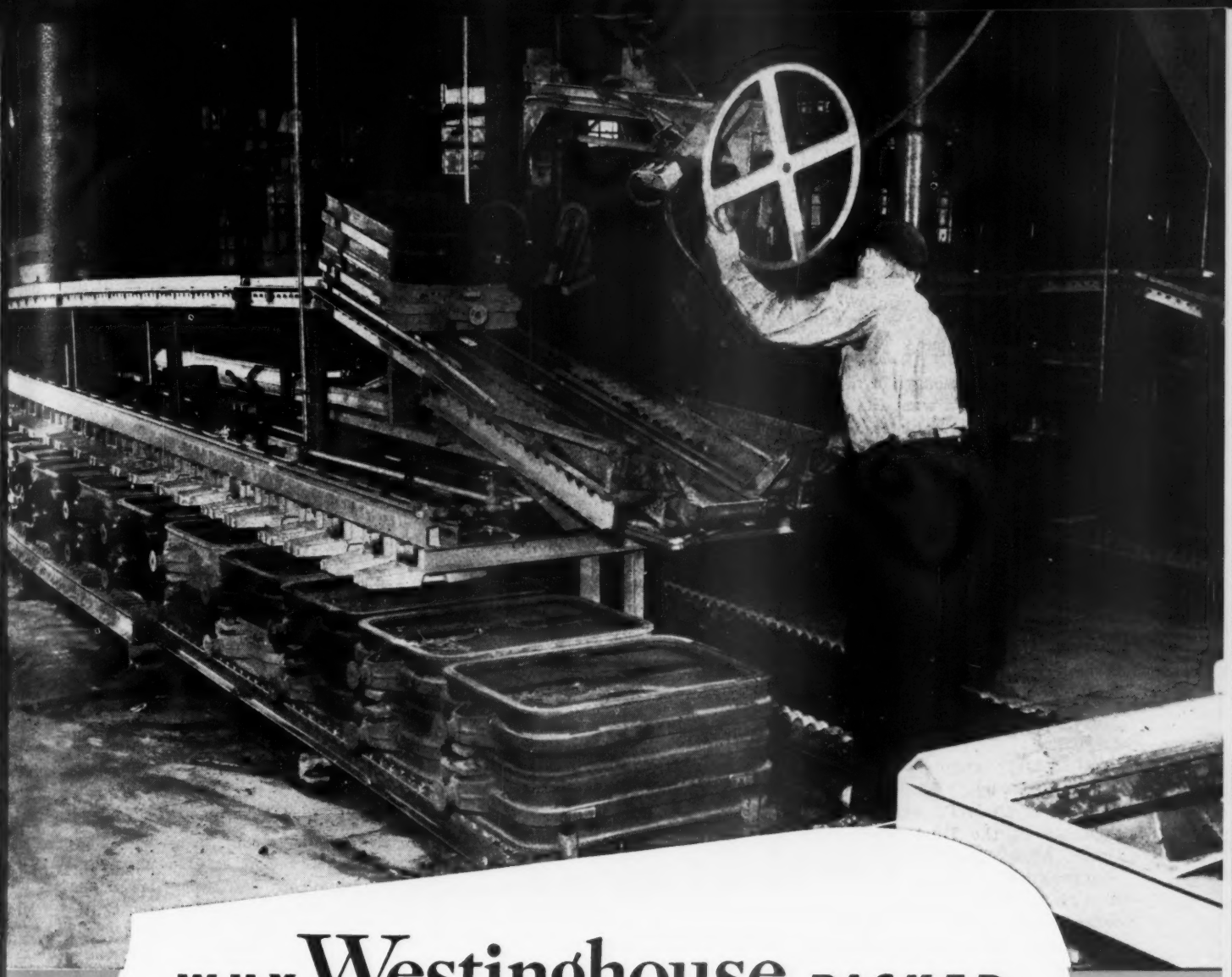
Timberline

INITIAL meeting of the year of Timberline Chapter of AFS was held at the Oxford Hotel, Denver. New officers are: Chairman, Curt Drake, Griffin Wheel Co.; vice chairman, James Schmuck, Rotary Steel Castings Co.; secretary, Thomas Widener, American Manganese Steel; treasurer, George Traut, Donald Pattern Works. Directors are: Roger Hageboeck, Electron Corp.; William Mansky, American Manganese Steel; Byron McPherson, McPherson Corp., and Harry Wilson, sales representative.

Speaker of the evening was M. W. Demler, Harbison - Walker Refractories Co., who presented a discussion on "New Applications of Refractories as an Aid to the Foundry." First considered were properties and uses of various molding materials other than molding sand which dealt with the work of the Steel Founders' Society of America research report No. 22 in developing new molding materials, many of which should find extensive foundry application.

In considering acid electric furnace linings, Mr. Demler discussed different refractories used in various parts of the electric furnace, with special emphasis on roof linings. In conclusion, he presented a history of the

(*Continued on page* 178)



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FOUNDRY BS&B FLASKS

(*Continued from page* 176)

development of the basic cupola and its present status. Seemingly the basic practice is becoming more popular throughout the country and the world, adapting itself very well to the production of the newly developed engineering irons.—*Harold Simmons, Electron Corp.*

Tri-State

NEW Developments in Foundry Refractories" was the subject of the talk presented by M. W. Demler, Harbison-Walker Refractories Co., Pittsburgh, at the Sept. 14 meeting of Tri-State Chapter of the AFS held in Tulsa, Okla. Mr. Demler discussed chiefly basic cupola operation and electric furnace roof refractory practice. In addition, a number of slides were shown to illustrate various methods of construction with standard shapes and ram mix.—*J. G. Winget, Reda Pump Co.*

Central Michigan

CURRENT chapter season was opened by Central Michigan Chapter of the AFS with a meeting Sept. 19 at the Hart Hotel, Battle Creek, Mich. Chairman T. T. Lloyd, vice president and plant manager, Albion Malleable Iron Co., Albion, Mich., extended greetings to the members and guests and outlined plans for the coming year.

Walter B. Millar, foundry superintendent, Battle Creek Foundry Co., served as technical chairman and introduced William T. Bean Jr. Mr. Bean is an expert in the field of stress analysis, and his subject was, "Sound Castings Can Be Engineered." Mr. Bean's fresh approach to the age-old problems of casting design made his lecture entertaining and instructive to all branches of the industry represented at the meeting. A clear and logical approach to the problem of stress analysis by the use of stresscoat and electronic strain gages proved highly informative.—*Richard H. Dobbins, Albion Malleable Iron Co.*

TRI-STATE Chapter of the AFS opened the 1951-52 season Sept. 14 with a meeting at Tulsa, Okla. Guest speaker, at left, was M. W. Demler, Harbison-Walker Refractories Co. C. C. Beagle, chapter secretary is at right. Photo courtesy of Fred E. Fogg, Acme Foundry & Machine Co.

Pittsburgh

OPENING meeting of the season was held by the Pittsburgh Foundrymen's Association, Sept. 17, at Fort Pitt Hotel. H. W. Lownie Jr., Battelle Memorial Institute, Columbus, O., discussed results of Battelle's recent investigation on performance of foundry coke. This paper, entitled "Need Stronger Foundry Coke," was presented in FOUNDRY, July, 1951.

Basic cupola operation comparisons with acid practice also were reviewed by Mr. Lownie. It was pointed out that economics of the process as well as technical aspects must be carefully weighed before any decision to change present practice is made. Results are as follows: .20 to .50 per cent more carbon pickup with basic operation; silicon loss is much higher with basic while manganese loss is somewhat lower; sulphurs of 0.02 per cent can be obtained at the spout with basic cupolas, tapping temperatures are 20 to 40 degrees higher with basic but the basic slag is considerably harder to handle than acid slag; melting loss is higher in basic operation and the iron produced has generally the same strength, hardness and fluidity as acid process iron, and refractory costs average about $14 per ton for acid while basic brick ranges between $40 and $70 per ton. —*W. H. Humphries Jr.*

CENTRAL MICHIGAN Chapter of the AFS met at Hart Hotel, Battle Creek, Mich., Sept. 19 for its first meeting of the season. Shown left to right, are: Walter B. Millar, Battle Creek Foundry Co., chapter technical chairman; T. T. Lloyd, Albion Malleable Iron Co., chapter chairman, and the speaker, William T. Bean, advisory engineer for problems in design stresses

Twin City

A JOINT meeting of Twin City Chapter of the AFS and the Twin Cities Foremen's Club was held Sept. 13 at the Covered Wagon, Minneapolis, to hear Ralph L. Lee, General Motors Corp., and FOUNDRY columnist speak on "Boss-to-Boss on the Job."

Nearly 200 members and guests were present to hear a splendid presentation on human relations. Mr. Lee dwelled on the fact that people do things because they feel like doing them and not because they think they are best.—*J. D. Johnson, Archer-Daniels-Midland Co.*

Wisconsin

FIRST fall meeting of the year for Wisconsin Chapter of the AFS was held Sept. 14. A sound movie produced under the auspices of Sen. Alexander Wiley of Wisconsin on "America in Crisis," was introduced by the senator.

After the dinner, members split up into discussion groups. The pattern group heard Cliff W. Schwenn, Brillion Iron Works Inc., Brillion, Wis., discuss "Pattern Rigging in Co-operation with the Foundry." Walter Kollmorgen acted as chairman. W. G. Reichert, W. G. Reichert Engineering Co., Newark, N. J., talked on "Foundry Management Looks Ahead with Push-Button Control," in the gray iron meeting. D. R. Hutchinson of Nash Motors, Milwaukee, presided. The steel group had Clyde A. Sanders, American Colloid Co., Chicago, as its speaker, and his topic was "How Can Raw Materials and Their Use Affect Metal Shrinkage?" Erwin G. Tetzlaff of Pelton Steel Castings Co., Milwaukee, acted as chairman.

(*Concluded on page* 180)

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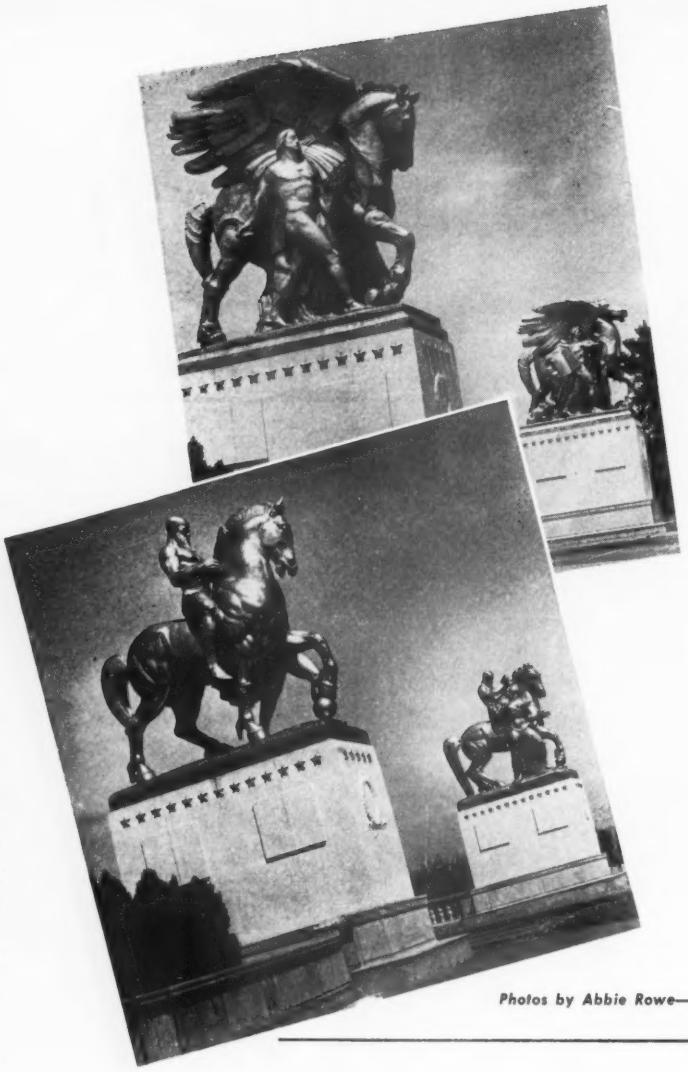

Italy Presents Statues to America

FOUR equestrian statues, a gift of the Italian people to the United States, were dedicated in Washington, Sept. 26. In a colorful ceremony held west of the Lincoln Memorial near the entrance to the Arlington Memorial Bridge and Rock Creek and Potomac Parkway, and presided over by Interior Secretary Oscar L. Chapman, the bronze statues were presented by Italian Premier Alcide de Gasperi and accepted by President Truman.

The statuary groups were designed and modeled by American sculptors Leo Friedlander and James E. Fraser. The designs were approved as part of the Arlington Memorial Bridge project twenty years ago. Offer of the Italian government to cast the figures was made in 1949 as a gesture of goodwill toward the United States. One group was cast in the Lagana Foundry near Naples. A second group was cast in the Bruni Foundry in Rome. The third group was cast in the Battagli Foundry, Milan. The fourth group was cast in the Marinelli Foundry in Florence. Two groups weigh 11 tons each, and two groups weigh 13 tons each. The entire foundry project covered a period of 14 months. The castings were made by the lost-wax method. One hundred pounds of 24-carat gold was applied to the surface of the castings to impart the so-called "fire-gilt" finish.

The figures are said to be the largest equestrian statues in the United States.

Photos by Abbie Rowe—Courtesy National Park Service

(*Concluded from page* 178)

B. C. Yearley, National Malleable & Steel Castings Co., Cicero, Ill., talked on "Malleable Gating Practice," before the malleable group. Norman N. Amrhein, Federal Malleable Co., served as chairman. The nonferrous group had Joseph A Gitzen, Delta Oil Products Co., Milwaukee, as its speaker and G. R. Funk, Waukesha Foundry Co., as chairman. Mr. Gitzen's talk was entitled, "Aspirin for Coreroom Headaches." — *John E. Hubel.*

Northwestern Pennsylvania

OVER 125 members and guests were present at the Sept. 24 meeting of Northwestern Pennsylvania Chapter of the AFS held at the Moose Club, Erie. Fred Carlson, Weil-McLain Co., Erie, introduced Clyde Sanders, vice president, American Colloid Co., Chicago, whose subject was "The Effect of Sand on Metal Shrinkage." Mr. Sanders, who is chairman of the AFS Sand Control Committee, with some colored slides presented the results of new experiments on the shrinkage problem of metals. He clearly demonstrated that there is a definite relationship between different types and mixes of sand and metal shrinkage, and that with good sand control yield can be increased considerably.

Mr. Sanders pointed out that by using correct clays, seacoal and the proper amount of moisture, shrinkage can be minimized and more uniform castings with smaller feeders will result. This was substantiated by photographs showing samples using the same metal at the same temperature.

Douglas James, Cooper-Bessemer Corp., Grove City, Pa., and chairman of the chapter announced a membership drive aiming at a chapter membership of 200. Dick Strong, Griswold Mfg. Co., was appointed entertainment chairman for the year. The chapter's Christmas party was announced for Dec. 7.—*Roy A. Loder, Erie Malleable Iron Co.*

Foundry's 50th Year

In commemoration of its fiftieth anniversary, United Engineering & Foundry Co., Pittsburgh, has published an illustrated booklet high lighting the company's past, and its position in the industry today as a builder of heavy metalworking equipment. The company operates five foundries —three of its own at Canton, O.; New Castle, and Vandergrift, Pa., and two subsidiaries, Stedman Foundry & Machine Co., Aurora, Ind., and Lobdell United Co., Wilmington, Del.

Book Review

Galvanizing (Hot-Dip), by Heinz Bablik, cloth, 502 pages, 5¼ x 8¼ in., published by John Wiley & Sons Inc., New York. Price $10.

Guiding thought in this book is that theory is the best guide to practice. Both the practical and theoretical aspects are emphasized in the discussions of scale, pickling, fluxes and galvanizing.

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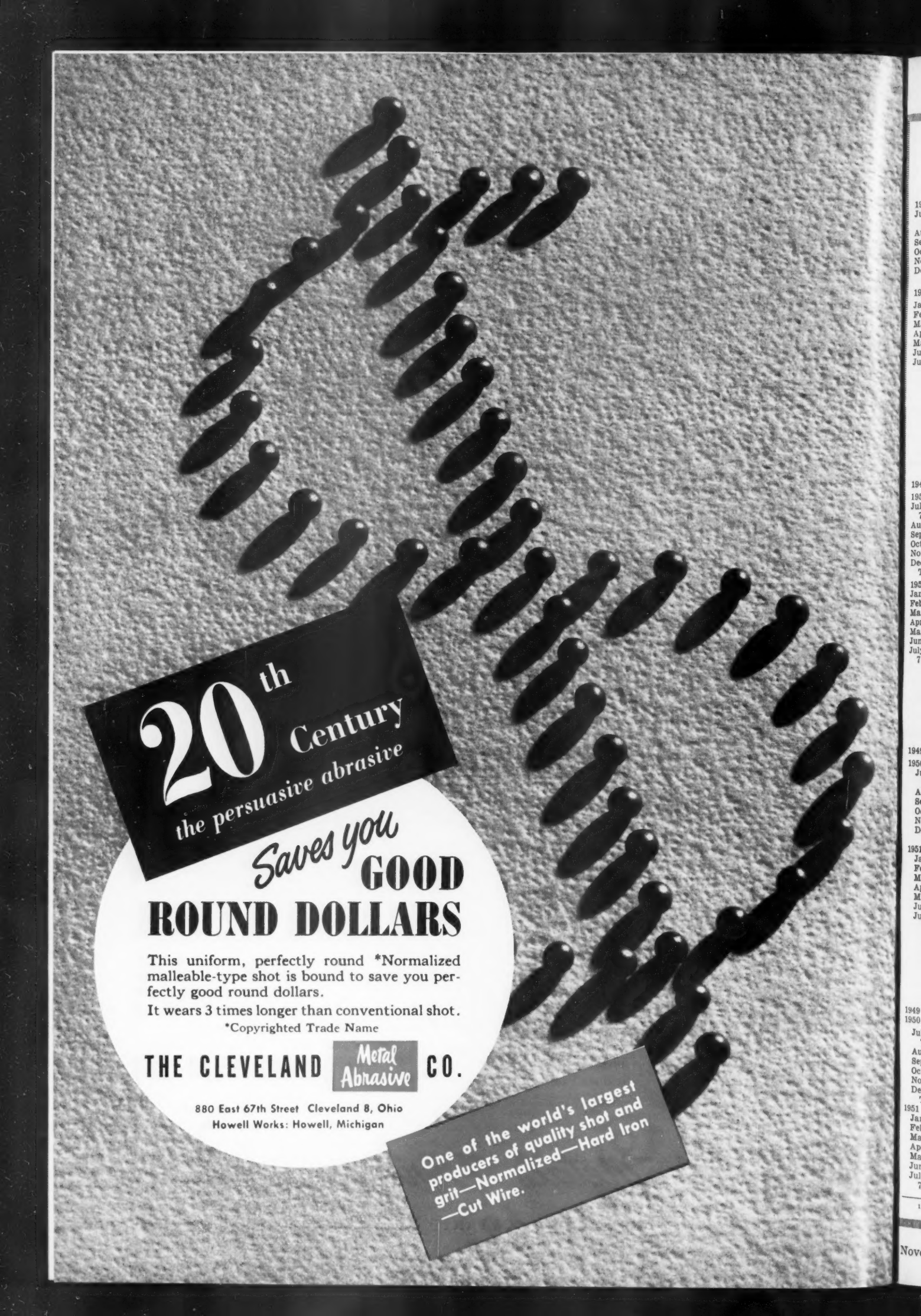
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Foundry STATISTICS

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1949	713,330	371,214	.....
1950			
July	67,514	37,198	105,300
7 mo.	485,361	265,328	.....
Aug.	86,021	50,019	132,374
Sept.	82,479	46,927	152,583
Oct.	89,968	50,157	160,278
Nov.	85,163	48,670	180,099
Dec.	91,510	51,091	194,950
Total	920,502	512,192	.....
1951			
Jan.	92,508	54,817	234,060
Feb.	88,950	54,915	255,347
Mar.	101,667	60,265	267,169
Apr.	97,276	57,554	276,463
May	100,800	61,373	274,954
June	94,376	57,176	258,144
July	76,826	45,072	263,017
7 mo.	652,403	391,172	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1949	304,409	106,825	102,908	87,812	.....
1950					
July	30,148	9,609	9,808	9,943	63,892
7 mo.	230,605	77,760	74,069	73,415	.....
Aug.	39,852	14,117	12,682	12,207	82,564
Sept.	42,061	14,369	13,085	13,594	89,723
Oct.	47,278	15,994	14,893	15,408	102,938
Nov.	46,816	16,099	14,040	15,715	67,931
Dec.	45,999	15,675	15,052	14,322	104,380
Total	452,610	154,013	143,821	144,661	.....
1951					
Jan.	42,538	14,401	14,554	12,641	93,264
Feb.	40,785	14,106	13,082	12,852	94,581
Mar.	42,204	15,900	12,771	12,677	100,453
Apr.	40,242	14,455	12,901	12,079	106,077
May	40,487	14,798	13,400	11,692	112,638
June	35,961	13,853	10,323	10,850	112,760
July	27,426	10,739	7,142	8,693	119,316
7 mo.	269,643	98,252	84,173	81,484	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Sand	Perm. Mold	Unfilled Orders[2]
1949	724,053	654,444	37,311	.....
1950				
July	69,003	62,384	3,789	39,392
7 mo.	522,593	471,349	27,043	.....
Aug.	94,013	85,948	4,258	52,513
Sept.	95,641	87,111	4,630	58,673
Oct.	105,746	96,911	5,064	66,560
Nov.	103,694	93,607	5,776	67,931
Dec.	100,548	90,513	5,985	69,569
Total	1,016,180	918,883	52,756	.....
1951				
Jan.	102,643	92,171	6,363	77,580
Feb.	96,946	87,667	5,427	75,967
Mar.	110,887	100,221	6,405	79,766
Apr.	101,506	91,852	5,802	82,711
May	105,438	95,049	5,986	84,002
June	98,559	88,818	5,358	83,518
July	76,551	69,334	4,064	85,837
7 mo.	692,530	625,112	39,405	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1949	9,364	8,781	....
1950			
July	727	677	3,356
7 mo.	5,546	5,175	....
Aug.	1,147	1,078	4,855
Sept.	1,231	1,154	4,942
Oct.	1,354	1,297	5,573
Nov.	1,508	1,434	6,928
Dec.	1,528	1,444	6,958
Total	12,314	11,582	....
1951			
Jan.	1,840	1,739	8,616
Feb.	1,907	1,801	10,878
Mar.	2,156	2,058	12,196
Apr.	2,267	2,161	12,191
May	2,334	2,206	12,867
June	1,758	1,642	14,331
July	1,676	1,557	15,528
7 mo.	13,938	13,164	....

Foundry Production Workers

Estimated Number

	June 1951	May 1951	June 1950
Gray Iron	162,000	162,700	137,900
Malleable	28,100	27,900	23,000
Steel	63,500	62,300	42,100
Nonferrous	91,100	93,000	77,700

Average Weekly Earnings

	June 1951	May 1951	June 1950
Gray Iron	$70.38	$70.58	$64.08
Malleable Iron	71.33	73.27	65.87
Steel	76.56	74.99	65.65
Nonferrous	73.28	74.07	66.52

Average Weekly Hours

	June 1951	May 1951	June 1950
Gray Iron	42.5	42.7	42.3
Malleable Iron	41.4	42.6	41.9
Steel	43.4	42.8	41.5
Nonferrous	41.8	42.4	41.6

Labor Turnover Rate (June)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	4.3	5.6	3.3	1.3
Malleable Iron	7.8	5.8	4.7	0.05
Steel	7.8	5.0	3.8	0.1
Nonferrous	7.0	4.5	3.2	0.5

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

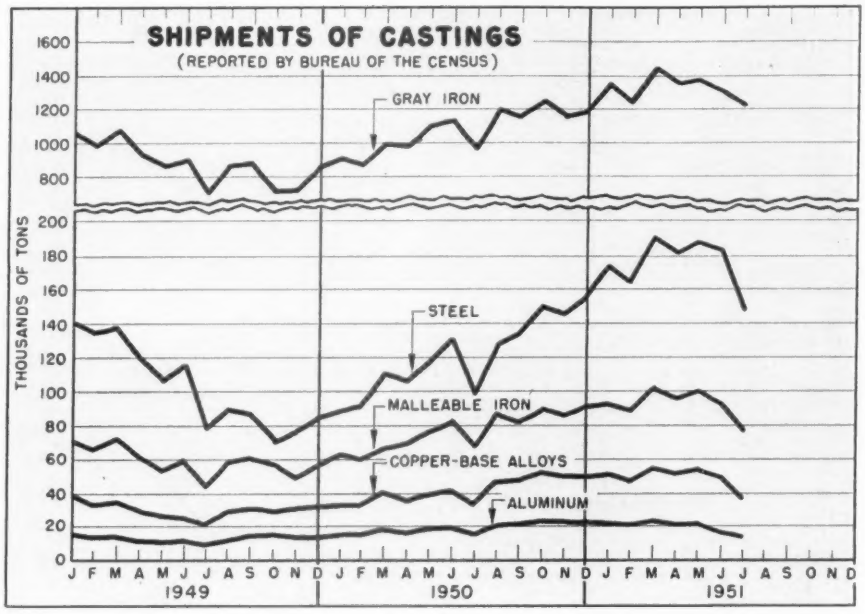
	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Chilled Railroad Car Wheels—For Sale	Pressure Pipe & Fittings—Total[3]	Soil Pipe & Fittings—Total[3]	Unfilled Orders[2] Total
1949	10,549,284	5,521,441	6,624,420	2,675,411	1,776,242	759,860	555,569	493,117	1,029,743	563,310	.....
1950											
July	961,450	507,867	595,918	241,632	177,154	82,363	35,066	30,560	94,438	58,874	1,286,579
7 mo.	6,947,108	3,544,066	4,375,935	1,713,681	1,279,908	574,072	282,484	248,342	605,443	403,528	.....
Aug.	1,201,569	677,134	747,046	335,868	199,770	92,340	52,508	46,681	131,127	71,118	1,670,380
Sept.	1,159,240	648,966	722,667	325,019	203,191	94,968	44,707	40,304	121,556	67,119	1,794,118
Oct.	1,254,901	700,512	792,764	364,607	220,821	100,082	46,516	41,023	119,105	75,695	1,839,866
Nov.	1,160,770	656,745	733,570	343,073	194,271	85,057	44,382	40,068	115,465	73,082	1,930,176
Dec.	1,181,974	652,929	745,766	333,033	210,700	98,071	43,667	39,984	111,066	70,775	2,012,480
Total	12,905,562	6,880,352	8,117,748	3,415,281	2,308,661	1,043,590	514,074	456,402	1,203,762	761,317	.....
1951											
Jan.	1,364,311	762,407	875,437	405,863	228,824	103,475	56,046	49,065	131,779	72,225	2,297,705
Feb.	1,234,226	684,928	811,724	369,932	193,648	91,598	49,423	43,967	117,141	62,290	2,391,843
Mar.	1,440,149	818,473	920,802	427,162	231,853	114,858	62,282	57,241	144,620	74,592	2,389,659
Apr.	1,363,041	766,735	880,381	403,619	217,970	106,417	61,993	54,002	134,302	68,395	2,336,926
May	1,396,236	796,053	897,913	418,950	225,129	112,145	65,721	57,485	139,854	67,619	2,228,596
June	1,308,987	742,794	847,024	395,329	216,620	108,042	58,620	52,700	121,851	64,872	2,162,152
July	1,028,812	568,126	653,656	301,749	200,764	97,575	40,792	35,202	88,217	45,383	2,208,116
7 mo.	9,135,762	5,139,516	5,886,937	2,722,604	1,514,808	734,110	394,877	349,662	877,764	455,376	.....

Steel Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[2] Total
1949	1,250,460	865,297	232,976	944,232	659,454	223,310	299,270	205,843	9,666	.....
1950										
July	98,269	68,874	15,734	70,122	51,204	14,577	28,147	17,670	1,157	255,418
7 mo.	746,694	520,118	116,256	548,518	385,821	106,373	198,176	134,297	10,883	.....
Aug.	128,369	94,413	24,922	92,197	70,721	22,952	36,172	23,692	1,970	329,944
Sept.	134,574	96,738	25,295	98,523	74,052	23,992	36,051	22,686	1,303	427,969
Oct.	149,558	109,660	30,048	112,704	85,157	28,493	36,854	24,503	1,555	521,846
Nov.	145,929	108,263	30,775	110,476	84,316	29,245	35,453	23,947	1,530	537,666
Dec.	155,258	113,692	34,061	118,744	88,552	32,160	36,514	25,140	1,901	554,187
Total	1,459,382	1,042,884	261,357	1,081,162	788,619	243,215	379,220	254,265	18,142	.....
1951										
Jan.	174,056	124,002	42,805	135,086	98,197	37,790	38,970	25,805	5,015	675,385
Feb.	163,976	117,156	42,565	126,293	93,461	36,793	37,683	23,695	5,772	706,989
Mar.	190,665	134,184	44,196	148,884	107,745	39,492	41,781	26,439	4,744	779,717
Apr.	181,908	129,059	41,545	139,948	102,367	37,553	41,960	26,692	3,992	846,947
May	189,232	131,102	39,845	143,201	101,363	35,511	46,031	29,739	4,334	881,702
June	184,424	131,219	42,337	141,538	103,090	38,200	42,886	28,129	4,137	895,054
July	146,463	100,141	27,585	111,191	78,034	24,516	35,272	22,107	3,069	929,978
7 mo.	1,230,724	866,863	280,878	946,141	684,257	249,855	284,583	182,606	31,063	.....

[1] Source: Bureau of the Census. [2] All cast iron pipe is shipped for sale. [3] For sale only.



Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment

	1950	1951
Jan.	159.3	368.0
Feb.	113.1	338.6
Mar.	225.2	399.0
Apr.	160.6	390.1
May	294.9	431.7
June	622.7	393.2
July	401.8	390.3
Aug.	693.6	404.5
Sept.	483.8	....
Oct.	526.8	....
Nov.	885.5	....
Dec.	526.2	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1949	63,637,429	63,462,233	2,778,868
1950			
Aug.	6,417,404	6,420,483	278,306
8 mo.	46,334,086	47,325,563	2,090,838
Sept.	6,263,214	6,243,584	274,657
Oct.	6,649,935	6,543,428	332,444
Nov.	6,243,970	6,131,733	317,120
Dec.	6,606,464	6,590,823	322,458
Total	72,097,669	72,735,131	3,337,517
1951			
Jan.	6,791,828	6,766,767	330,698
Feb.	6,001,538	6,036,774	293,189
Mar.	6,692,460	6,693,661	299,190
Apr.	6,484,258	6,354,400	356,816
May	6,747,163	6,732,825	368,511
June	6,574,621	6,645,155	330,920
July	6,636,335	6,502,058	301,125
7 mo.	45,926,371	45,729,803	2,280,283
Aug.	6,777,722	6,679,850	303,340
8 mo.	52,705,925	52,411,490	2,583,772

Ingot Brass and Bronze

(Shipments in net tons)

	1950	1951
Jan.	18,874	28,416
Feb.	18,487	27,168
Mar.	22,494	31,907
Apr.	22,118	30,472
May	23,643	33,267
June	25,093	33,817
July	21,609	32,016
Aug.	29,689	25,285
Sept.	28,811	.....
Total for year	303,563	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1949	377,779	248,679	.....
1950			
7 mo.	292,406	183,519	.....
Total	536,398	341,833	.....
1951			
Mar.	44,218	27,959	100,652
Apr.	43,513	28,565	101,949
May	44,187	29,092	100,299
June	41,341	28,278	95,174
July	34,064	23,088	85,028
7 mo.	287,453	189,935	.....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	All Scrap Purchased	By Types of Furnace: Cupola Total	Cupola Purchased	Air Total	Air Purchased	Electric Total	Electric Purchased
1949	49,281,000	22,922,000	7,968,000	4,175,000	801,000	276,000	4,239,000	2,608,000
1950								
June	5,122,000	2,483,000	864,000	427,000	92,000	33,000	533,000	317,000
6 mo.	30,120,000	14,332,000	4,614,000	2,232,000	485,000	177,000	2,902,000	1,749,000
July	4,708,000	2,244,000	669,000	318,000	79,000	28,000	490,000	295,000
Aug.	5,202,000	2,454,000	862,000	426,000	108,000	39,000	568,000	327,000
Sept.	5,170,000	2,468,000	819,000	404,000	109,000	40,000	579,000	348,000
Oct.	5,643,000	2,707,000	866,000	437,000	108,000	40,000	643,000	384,000
Nov.	5,293,000	2,598,000	841,000	431,000	107,000	39,000	593,000	364,000
Dec.	5,361,000	2,600,000	803,000	418,000	122,000	44,000	600,000	361,000
12 mo.	61,497,000	29,403,000	9,474,000	4,666,000	1,118,000	407,000	6,385,000	3,828,000
1951								
Jan.	5,975,382	3,010,300	1,009,142	533,705	110,004	41,116	684,484	435,633
Feb.	5,337,562	2,691,692	936,918	492,395	101,233	38,135	627,308	398,814
Mar.	6,187,520	3,100,622	1,064,325	558,833	108,513	39,260	728,786	463,371
Apr.	5,987,947	3,013,527	1,029,069	545,897	103,458	37,973	704,416	457,521
May	6,096,678	3,087,313	1,063,281	568,198	111,914	39,312	734,483	484,878
June	5,693,402	2,847,856	.....	.....	.....	.....	.....	.....
6 mo.	35,278,491	17,751,310	.....	.....	.....	.....	.....	.....

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1949	53,408.7	2,821.9	2,294.5	41,312.5	6,979.8	47,928	4,510	235	96
1950									
Aug.	5,706.2	257.0	284.0	4,407.3	757.9	5,136	516	30	18
8 mo.	42,212.0	1,875.5	1,891.0	33,060.3	5,384.2	38,220	3,601	188	167
Sept.	5,614.6	244.0	257.2	4,380.9	732.5	5,092	500	26	17
Oct.	5,836.8	284.1	260.6	4,541.2	741.0	5,219	466	31	13
Nov.	5,316.5	277.1	279.1	4,093.7	666.6	4,817	462	30	14
Dec.	5,609.2	264.9	260.2	4,374.4	709.8	5,068	456	34	15
12 Mo.	64,589.1	2,870.4	3,034.2	50,450.5	8,234.0	58,416	5,475	319	326
1951									
Jan.	5,801.7	300.0	233.3	4,529.8	738.6	5,367	542	32	11
Feb.	5,084.8	238.7	226.0	4,007.2	612.9	4,725	492	29	10
Mar.	5,919.3	267.9	276.5	4,647.5	727.5	5,406	550	33	15
Apr.	5,812.2	259.1	261.0	4,575.8	716.1	5,281	516	31	11
May	6,104.9	282.0	259.4	4,777.0	786.5	5,522	533	31	11
June	5,911.3	254.2	276.5	4,631.9	748.7	5,348	....	..	..
July	5,994.8	280.4	250.0	4,702.8	761.6	....	....	..	..
Aug.	5,988.6	252.7	254.4	4,723.3	758.2	....	....	..	..
8 mo.	46,617.6	2,135.0	2,037.1	36,694.8	5,850.1	....	....	..	..

* Source: U. S. Dept. of Interior, Bureau of Mines. ** Source: American Iron & Steel Institute. [1] Source: Bureau of the Census. [2] For sale only.

YOU HAVE TO HAVE A BULL

Milk is as unmysterious an item as you can think of. It comes from cows. Farmers sell it to dairy companies—and you get it at the corner store, or tell the milk-man to bring it. We consume vast quantities of it. Milk is basic.

On the production side, milk comes from scientifically developed dairy herds, housed in immaculate barns.

There's one item often overlooked: the bull.

In order to create and maintain a healthy, productive, permanently profitable herd, you have to have a bull.

It's exactly the same with the Foundry Industry—and castings.

Castings are rolling mills and mining equipment.

Castings are freight-cars and motor trucks.

Castings are machine tools and diesel engines.

Castings are aircraft units and cannon, fuse parts and tanks, minute timing mechanisms.

You can't have any of these essential things without castings.

Castings are like milk—*basic*.

Everybody wants castings—but to make sure of a continuous, adequate supply of castings, you have to have a bull.

In the production of castings, the "bull" is the Foundry Equipment Industry.

There is some loose talk going around, without any sound thinking back of it, as to limitation of raw materials for the Foundry Equipment Industry.

That's just as sensible as attempting to guarantee a steady, ample supply of good milk by throttling the bull.

It is high time, we believe, that someone speak up clearly in behalf of the bull. It may, at times, be expedient—perhaps necessary—to control the uses to which castings shall be put; but it seems to us a zero in constructive planning to restrict in any way the Foundry Industry's capacity to produce.

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Castings Cleaning Systems—Wet Sand Process

Sand Reclamation Systems

Wet Sand Cleaning Systems for Heat Exchangers

and other Refinery Equipment

International Congress

(*Continued from page* 101)

Testing Methods, Foundry Defects and the Dictionary of Foundry Terms were held during the congress. The first presentation of the Award of Honor of the International Committee, founded by Commandatore Mario Olivo, of Milan, was also made on this occasion. A special program had been organized for the ladies, including conducted tours to Ghent, Bruges, Antwerp and other places of interest.

The congress, which was under the patronage of H. M. King Baudoin, opened Monday, Sept. 10. The Belgian minister of Economic Affairs presided and was supported by F. W. Spies, president of the International Committee of Foundry Technical Associations and of the Dutch Foundry Association, and by Marcel Borgerhoff, managing director of S. A. Fonderies J. Marichal, Ketin & Co. and president of the Belgian Foundry Technical Association.

President Borgerhoff first addressed the meeting and mentioned that, in addition to the minister who was present, the support of several high officials had been obtained, and more notably that of the governor of the province of Brabant, and of the Burgomaster of Brussels who offered a reception at the city hall on the same evening. The congress was fully supported by the foundry and kindred industries and by the research organizations, and material assistance had been given by the Federation des Entreprises de l'Industrie des Fabrications Metalliques (Fabrimetal), which had placed part of its building and staff at the disposal of the organizers. Mr. Borgerhoff paid tribute to the president of the International Committee, F. W. Spies, and recalled the successful international congress held in Amsterdam in 1949.

He referred to the progress of science applied to the foundry industry in recent years, and mentioned that the tensile strength of cast iron had increased tenfold, at least as regards special irons, between 1914 and the present. He stated that the Association Technique de Fonderie de Belgique had been founded 40 years ago in 1911, and that, at present, the Belgian foundry industry gave employment to 15,000 workers in some 600 foundries. He referred to the formation of the International Committee of Foundry Technical Associations, 25 years ago next year, and said that five past presidents—J. Leonard, V. Delport, G. Vanzetti, V. C. Faulkner and Rene Deprez—were present, as well as the honorary secretary, Tom Makemson, who had held this post since the foundation of the Committee.

Mr. Spies, on behalf of the foreign associations, expressed his thanks to the Belgian association and offered congratulations for the manner in which the arrangements for the congress had been made. He paid his respects to the young king and expressed his appreciation of the courtesies extended by the minister, and the government and state officials. He stressed the importance of the papers to be presented at the technical sessions and said that the opportunity for exchanging ideas and making personal contacts was no less important.

He said that such international congresses stimulate co-operation, teamwork and method, and help to avoid duplication of work and research. He mentioned that this year had seen the foundation of a research center in the Netherlands, which was prepared to co-operate fully with similar organizations in other countries. He also made a plea for facilities to be offered to exchange technicians between nations, and ended by saying that the congress would mark the progress of the Belgian industry and would help men of goodwill to work for peace.

The minister of Economic Affairs paid tribute to the Belgian association and to Fabrimetal, who were responsible for the organization of the congress. He mentioned that Belgium was the first continental European country to follow the lead of Great Britain in the industrial revolution, and gave evidence of the progress made in technical developments and resources. These advances were such that a new problem had arisen from shortage of raw materials. More research work to overcome this problem was essential, and hard work on the part of all concerned was equally necessary. The Belgian state was contributing its share in supporting research organizations, such as the Institut pour la Recherche Scientifique dans l'Industrie et l'Agriculture (IRSIA). In declaring the congress open, the minister stated that the ultimate aim of such congresses is to improve the livelihood of the human race.

At the meeting of the International Committee of Foundry Technical Associations, held Sept. 13, the following associations or foundry sections of technical associations were unanimously elected members of the Committee: Verband Schweizerisher Eisengiessereien (V.S.E.), Zurich, Switzerland; Instituto del Hierro y del Acero, Madrid, Spain; Dansk Stoberi-

(*Continued on page* 188)

President Borgerhoff of the Belgian Association addresses the opening meeting of the congress. Seated at the table, left to right, are: E. O. Lissell, Sweden; J. H. Kuster, Germany; Tom Makemson, Great Britain; D. Waeles, France; Belgian Minister of Economic Affairs; F. W. Spies, International Committee president; Colin Gresty, Great Britain; Vincent Delport, Foundry, Great Britain, and AFS delegate; Mario Olivo, Italy; V. C. Faulkner, Great Britain

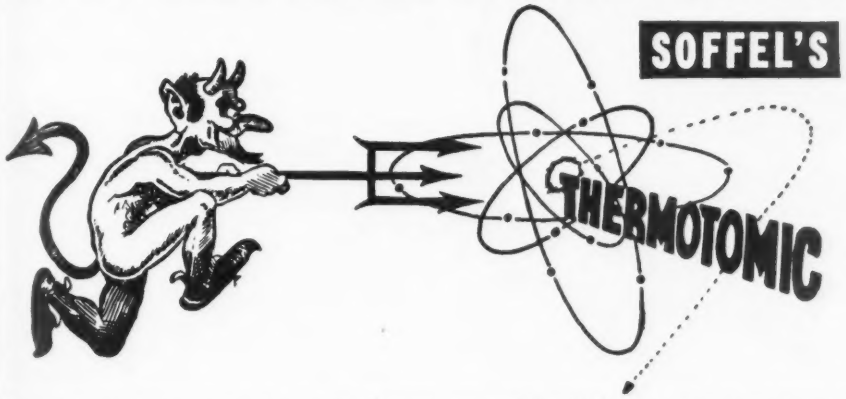
SOFFEL'S
New THERMOTOMIC-X
(Patented)

exothermic metal feeding compound

✓ CUTS CASTING COSTS

✓ MAKES BETTER CASTINGS

FOR STEEL, STAINLESS STEEL, GRAY OR NODULAR IRONS, COPPER, BRASS, BRONZE AND ALUMINUM



Riser feeding necks are reduced to one or two inch diameters.

Heads are knocked off without cutting or burning.

Eliminates shrinkage and piping in castings.

Thermotomic Compound is an exothermic material which is molded and baked into any desired shape just as sand cores are made. It produces a temperature of 3500° F. It is used as ring inserts under the risers or feeding heads, or as facing inserts where it is desirable to maintain the fluidity of the metal in the mold at those points where rapid cooling may cause piping, shrinkage or segregation.

Great savings are realized through reduced riser dimensions and cleaning costs. For use in green sand molds, use Thermotomic WP (waterproofed). Soffel's Carbon-Free Liquidizer No. 5 is recommended for use with Thermotomic feeding compounds on top of the feeding heads. Thermotomic ABC and AL-X31 Liquidizer are recommended for aluminum.

EXOTHERMIC CARBON FREE LIQUIDIZER

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is the leader in major foundries for use on ferrous and nonferrous metals, and in ingot production. It is the first and the original scientific non-carbon exothermic compound for feeding heads and risers.

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is different from ordinary head compounds in two ways: It is CARBON FREE, thereby eliminating carbon pick-up. It is EXOTHERMIC. Carbonaceous materials, regardless of their composition, will cause carbon pick-up, segregation, non-uniform grain structure and hard spots under risers and in castings. Carbonaceous materials contribute no added heat value or increased temperatures to the feeding metal and only act as an insulating cover.

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER reacts within itself exothermically, producing a temperature above 3200° F. actually increasing the temperature of the feeding metal to a point well above that of the metal in the main body of the casting, thus ensuring that the feeding metal will be the last to freeze. Shrink cavities in the casting caused by premature freezing of the feeding metal are eliminated. After the exothermic action has ceased, the LIQUIDIZER forms an insulating blanket on the metal. This confines the heat generated by the LIQUIDIZER and aids in maintaining the desired high temperature of the feeding metal in the heads.

THERMOTOMIC HOTOP CARBON FREE LIQUIDIZER

SOFFEL'S THERMOTOMIC HOTOP CARBON FREE LIQUIDIZER is for castings of iron and steel. A new exothermic compound which produces over 4000° F. of heat. It is used for dissolving and reducing skulls in ladles of iron and steel, also on the feeding heads and risers of castings and for ingot hot-topping.

SOFFEL'S THERMOTOMIC HOTOP will permit reducing feeding heads from 60 to 70% or the height as low as one-third the size of the diameter.

For ladle use when SOFFEL'S THERMOTOMIC HOTOP is applied to cold, sluggish metal of iron or steel on the surface of the metal, the exothermic action of THERMOTOMIC HOTOP increases the temperature several hundred degrees and adds fluidity. It will save much metal which would have been discarded as scrap. THERMOTOMIC HOTOP is guaranteed not to change the chemical analysis of iron or steel, as it is carbon free and is recommended only for ferrous use.

Beware of Imitations: **We are the originators of Exothermic Carbon Free Liquidizers and Patented Thermotomic Compounds.**

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(*Continued from page page* 186)

teknisk Forening, Copenhagen, Denmark; Stoperiteknisk Forening, Oslo, Norway; Institute of Indian Foundrymen, Calcutta, India. Membership of the International Committee now comprises associations from 15 nations.

The program of forthcoming international congresses was confirmed as follows: 1952 United States, 1953 France, 1954 Italy, 1955 Great Britain.

The following officers for 1952 were elected unanimously:

President, Guido Vanzetti, president of the Italian foundry technical organization; for vice president, the American Foundrymen's Society was invited to nominate the vice president for next year. Tom Makemson was re-elected, with acclamation, as honorary secretary for 1952.

Reports of the subcommittees on Cast Iron Testing Methods, Foundry Defects, and the International Dictionary of Foundry Terms were adopted.

At the closing banquet, the Award of Honor of the Committee, in the form of a reproduction in bronze of the statue of Perseus from the original masterpiece of Benvenuto Cellini was presented by Committee President F. W. Spies to Rene Deprez, immediate past president of the International Committee, and past president of the Association Technique de Fonderie de Belgique. The award recognized the eminent services he had rendered to the Belgian foundry industry and the part he had played in fostering international relations between foundry associations.

President Walter L. Seelbach of the American Foundrymen's Society conveyed the greetings of American foundrymen to their colleagues of other nations and expressed their willingness to collaborate with them in every way possible. He extended a cordial invitation to foundrymen of the member associations to attend the International Foundry Congress at Atlantic City in the spring of 1952; he gave some preliminary indications of the events that will take place there and expressed the hope that many of those present would again be reunited on that occasion.

Technical Sessions—Forty-six papers were presented at the technical sessions. They included official exchange papers from the technical associations of Belgium, France, Germany, Great Britain, Italy, the Netherlands, Sweden and the United States. Prominent among the subjects treated was that of nodular cast iron, which was dealt with or referred to in no less than ten papers, and gave rise to a considerable and interesting discussion. The thermal aspects of

solidification of castings and calculation of risers and feeding heads was the subject of three important papers. The remaining papers covered a wide variety of subjects relative to many aspects of ferrous and nonferrous casting.

Nodular or spheroidal cast iron was treated in the following papers:

"As-Cast Structure of Ca-Mg Treated Nodular Cast Iron With and Without Secondary Inoculation," by Prof. A. L. de Sy, University of Ghent, Dr. J. Vidts and R. Collette, attached to the research center for cast irons, of which Prof. de Sy is the director. Two types of nodulizing alloys were considered: Ca-Cu-Si type with 1.5 to 2 per cent Mg and the Ca-Cu type with 1.5 to 2 per cent Mg. Comparison of the results from three series of heats produced *without* secondary inoculation, and three series of heats of almost identical composition produced *with* secondary inoculation, showed very definitely that secondary inoculation is at least unnecessary; indeed the mechanical properties of the nodular irons produced without secondary inoculation were generally better. It was also stated that low-carbon irons and definitely hypo-eutectic compositions were less favorable than nearly eutectic irons for the production of nodular iron.

Discuss Ca-Mg Treatment

Another paper by the same authors was entitled "Possibilities of the Combined Treatment Ca-Mg for Nodular Iron." The authors compared the combined Ca-Mg process for the production of nodular iron with the straight Mg process. Three hundred experimental heats were treated by the Ca-Mg process, without secondary inoculation. The mechanical properties of the nodular irons thus obtained were studied in relationship to the structure either as cast, or after complete annealing. According to the structure of the matrix, four classes were considered: Pearlitic nodular irons; nodular irons with a continuous pearlitic network; nodular irons with a continuous ferritic network; and ferritic nodular irons. Plotting mechanical properties against structure of the matrix, very regular curves were obtained for tensile strength and elongation. In conclusion, the authors stated that the Ca-Mg process offered serious possibilities for industrial applications. This paper was the official exchange paper of the Association Technique de Fonderie de Belgique and, together with the previous one, was based on investigations sponsored by IRSIA, the Belgian scientific research organization, and by Fabrimetal.

R. P. Dunphy, metallurgist, Naval Research Laboratory, Washington,

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and W. S. Pellini, head of the Metal Processing Branch, contributed a paper on "Nodule Genesis and Growth in Magnesium Treated Hypoeutectic Irons." The authors arrived at the following tentative conclusions: Stage I: The solidification of dendrites of austenite beginning at the liquidus temperature and continuing to the temperature at which the normal eutectic, consisting of flake graphite and austenite, would occur. Stage II: Suppression of the normal flake graphite eutectic, during which interval graphite precipitates from localized regions of supersaturated interdendritic liquid in a spherulitic crystallization mode. Stage III: Solidification of the remaining eutectic liquid as an austenite-iron carbide complex, and rapid malleablization of the structure resulting in growth of the graphite particles in the structure.

Another paper on the formation of graphite nodules was the exchange paper of the Verein Deutscher Giessereifachleute, "About Graphite Nodule Formation," by Dr. Ing A. Wittmoser, head of the research center of the Eisenwerke-Gelsenkirchen A.G. As a result of microscopic investigations, the author offers the following explanation of the formation of graphite nodules in Mg-treated cast iron: The Mg treatment completely changes the primary structure of the cast iron. Common eutectic gray cast iron with a weak segregation shows an irregular graphite distribution. On the contrary, the same iron presents, after Mg treatment, a definite primary structure with distinct segregation areas; in this the graphite is principally localized in the center of the globular mixed crystals, which appear very distinctly as a result of segregation.

From this, it is suggested that by the Mg treatment (or any other nodulizing treatment) the possibility of graphite formation is highly restricted as a result of the destruction of crystallization favorizing germs. Consequently, and corresponding to a given undercooling of the melt, the range of existence of the solid solution is moved so far to the right, in the case of successful treatment, that the treated alloy still happens to be in this range. On subsequent cooling of a successfully treated melt, the mixed crystals, highly supersaturated in carbon, are separated; in these crystals the graphite spherulites form on subsequent cooling.

Different Mechanical Properties

"A Study of Some Self-Hardening Spheroidal Graphite Alloy Cast Irons" was the title of a contribution by Dr. M. Ballay, director of the Center of Information for Nickel, Paris, R. Chavy, consultant, and J. Grilliat. The authors state that spheroidal graphite cast irons have different mechanical properties according to the heat treatments to which they are submitted. The lamellar graphite cast iron called self-hardening is of great interest in industry. The aim of the authors was, by using spheroidal graphite iron, to make similar irons with a slow critical quenching speed, and to verify their properties. The irons were magnesium treated. The tests made showed that one can obtain without trouble cylindrical castings of more than 100 mm. diameter, the hardness of which is more than 450 brinell. These castings are easily machined after annealing. The quench allows the hardening of thick sections without any risks of shrinkage crack, and extends the range of application of these irons.

J. E. Rehder, Physical Metallurgy Division, Mines Branch, department of Mines and Technical Surveys, Ottawa, Ontario, contributed a paper on "The Annealing and Heat Treatment of Nodular and Other Cast Irons." The author outlines general principles and gives quantitative data concerning the heat treatment of various cast irons. Most of the work was on blackheart malleable and nodular irons. but the consistency was very good throughout the field. Actual mechanical properties obtained by given heat treatments are, of course, not the same in the three general fields of malleable irons, gray cast irons and nodular irons, due to the profound effects of the mode of distribution of the free graphite, which is not amenable to major modification by heat

(*Continued on page* 192)

First Award of Honor Is Presented At International Foundry Congress

RENE DEPREZ

FIRST annual Award of Honor of the International Committee of Foundry Technical Associations for outstanding achievements in foundry work was made to Rene Deprez, Sept. 13, during the International Foundry Congress, Brussels, Belgium.

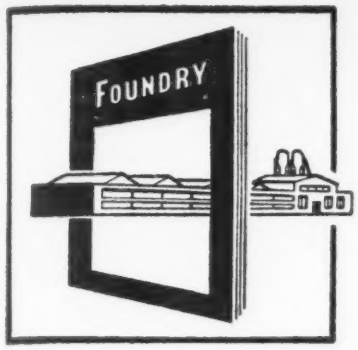
Mr. Deprez, a civil and mechanical engineer, is a graduate of the Ecole des Ingenieurs de Liege. He is managing director, S. A. des Usines J. M. Deprez-Joassart, Herstal-lez-Liege, Belgium; director of the Federation des Entreprises de l'Industrie des Fabrications Metalliques (Fabrimetal) and president of the foundry technical committee of Fabrimetal.

MARIO OLIVO

A member of the councils of the Center of Research on Nodular Iron and the Center of Reseach for the Metallurgical Industry, he is a past president of the Association Technique de Fonderie de Belgique (1944-49), and of the International Committee of Foundry Technical Associations (1949).

The Award of Honor is an original reproduction of Benvenuto Cellini's statue, representing the victory of Perseus over the Gorgon Medusa of Greek mythlogy—the symbol of good conquering evil, of spirit overcoming force, of mind's mastery over matter. Consequently, it was chosen as best fitted to represent the hardships suffered by a foundryman and the success which attends his perseverance.

Donor of the award is Mario Olivo, Milan, Italy, who selected the statue as symbolic. Arrangements were made with the Italian government and the Superior Council of Fine Arts to use an original model of the statue kept at Florence National Museum for making a plaster cast and subsequently through the investment casting process to produce the Award of Honor.



For Your Convenience

Dear Reader:

IF YOU WOULD LIKE MORE INFORMATION ON ANY ADVERTISEMENT IN THIS ISSUE, USE ONE OF THESE RETURN CARDS.

Write the name of the advertiser and the page number of the ad in the spaces provided. Check the type of information you want. After you have finished going through this issue of FOUNDRY and have jotted down all of the ads on which you'd like more information, just tear out the card, drop it in the mail. We'll do the rest.

Our staff will forward this information to the advertiser immediately so you'll be relieved of the necessity of writing several letters. You'll hear from the advertiser directly, answering your request.

Most copies of FOUNDRY are read by several individuals. We have provided three cards to accommodate all who wish to use this service.

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Readers Service

Please send further information on the following advertisements in this issue:

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YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

FDY 11-51

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

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No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio
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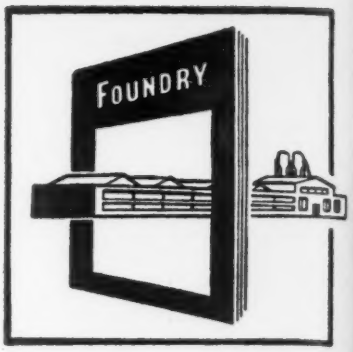
For Your Convenience



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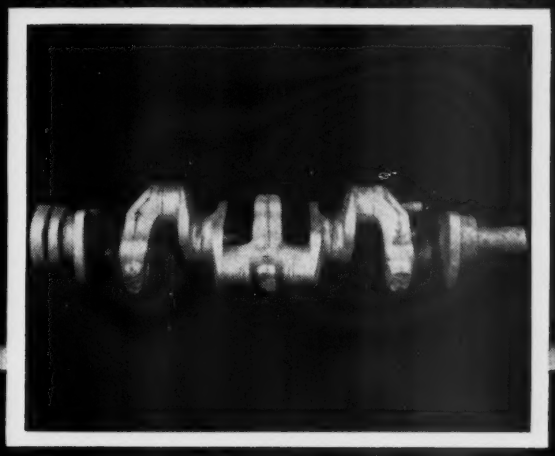
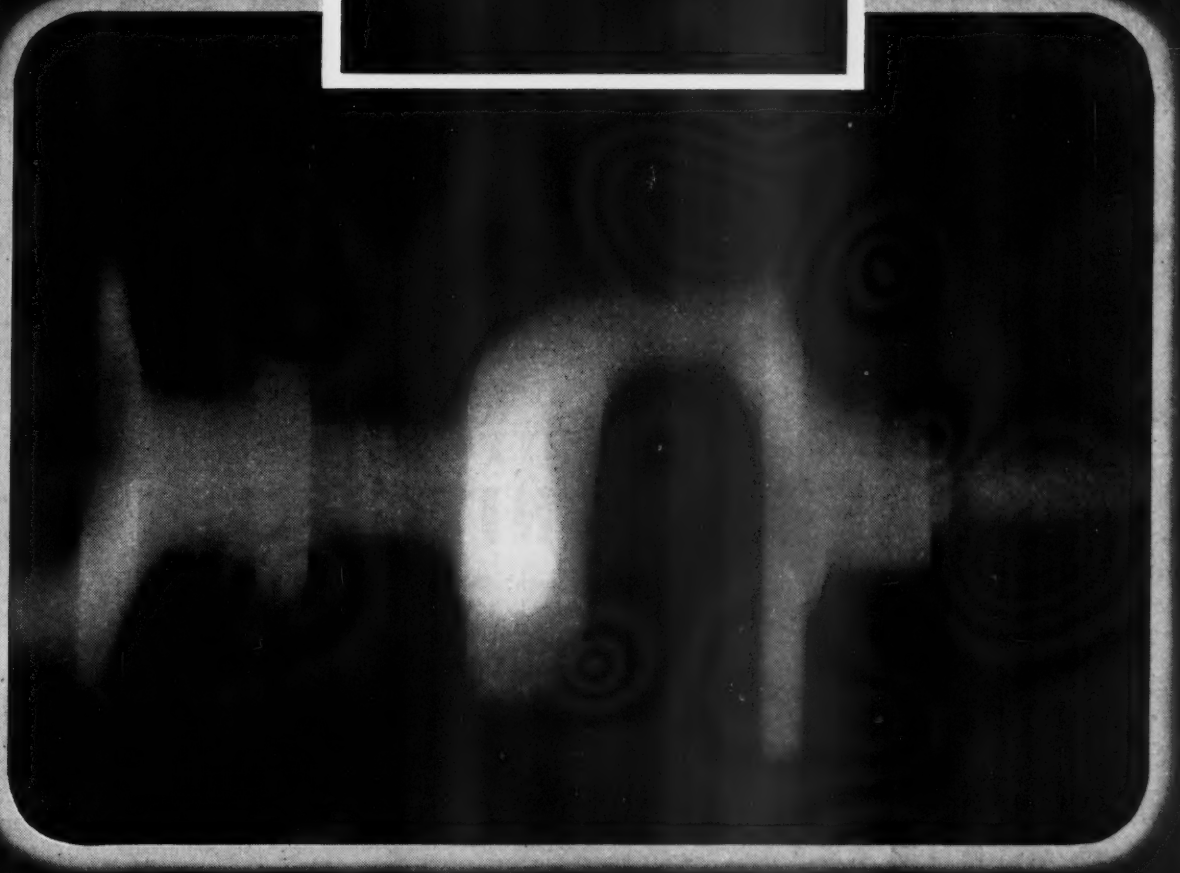
FOUNDRY
Readers Service

Photograph of automotive crankshaft shown in radiograph below.



WILL IT STAND THE GAFF?

IS IT WORTH MACHINING TIME?



Radiography provides the answers

THERE'S a lot more at stake in a crankshaft than mere pounds of steel. Should it let go, the reputation of the foundry can go with it. Costly machining time can be wasted . . . and great inconvenience caused by a breakdown in service.

Best assurance against failure comes through radiography. With it you can check internal conditions with no damage to the part—make sure that no serious hidden flaw exists.

Radiography has become a regular part of many foundries' routine. It forestalls releasing imperfect castings—helps build reputations for consistently good work. It frequently shows how casting operations can be improved to provide higher yields in production runs.

If you'd like to know what radiography can do for you, discuss it with your x-ray dealer. Also send for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE-MARK

—ALL THAT FINE QUALITY

NATIONAL BENTONITE

An ample supply of National Bentonite *is* a glad sight to many a good foundryman, because its *consistent* high quality helps a lot in making better castings.

Molds bonded with National Bentonite have high green strength and good hot strength both, and greatly reduce the hazards of gas holes and blows. Castings from these molds also have finer finish—a point which is particularly appreciated by non-ferrous metal foundries.

BAROID
SALES DIVISION
NATIONAL LEAD COMPANY

BENTONITE SALES OFFICE
RAILWAY EXCHANGE BLDG.
CHICAGO 4 • ILLINOIS

These APPROVED DISTRIBUTORS are ready to supply you.

American Cyanamid Co.
New York, New York

American Steel & Supply Co.,
332 South Michigan Avenue, Chicago 4, Illinois.

The Asbury Graphite Mills, Inc.
Asbury, New Jersey

Barada & Page, Inc.
Kansas City, Missouri
(main office)
Also—(Branches)
Tulsa, Okla.
Oklahoma City, Okla.
Wichita, Kansas
Dallas, Texas
Houston, Texas
New Orleans, La.

G. W. Bryant Core Sands, Inc.
McConnellsville, New York

Lloyd H. Canfield Foundry Supplies
Kansas City, Kans.

Combined Supply and Equipment Company
Buffalo 7, N. Y.

The Foundries Materials Co.
Coldwater, Mich. Also (branch) Detroit, Mich.

Foundry Service Company
North Birmingham, Ala.

James R. Hewitt
Houston, Texas

Interstate Supply & Equipment Co.
Milwaukee 4, Wis.

Independent Foundry Supply Co.
Los Angeles, Calif.

Industrial Supply Co.
San Francisco, California

Klein-Farris Co., Inc.
Boston, Massachusetts
New York—Hartford, Conn.

La Grand Industrial Supply Co.
Portland, Oregon

La Salle Builders Supply, Ltd.
Montreal, Quebec, Canada

Marthens Company
Moline, Illinois

Carl F. Miller & Co.
Seattle, Washington

Pennsylvania Foundry Supply & Sand Co.
Philadelphia, Pennsylvania

Refractory Products Co.
Evanston, Illinois

Robbins & Bohr
Chattanooga, Tennessee

Smith-Sharpe Company
Minneapolis, Minnesota

Steelman Sales Co.
Chicago, Illinois

Stroller Chemical Co.
Akron, Ohio

Wehenn Abrasive Co.
Chicago, Illinois

Mr. Walter A. Zeis
Webster Groves, Missouri

(*Continued from page* 190)

treatment, except in the malleable irons. However, the principles outlined were considered to be valid in the production of any given matrix structure in the cast irons.

The exchange paper of the Institute of British Foundrymen was by N. Croft, chief metallurgist, Lloyds (Burton) Ltd., Burton-on-Trent. He dealt with "Quantity Production of Spheroidal Graphite Cast Iron." After giving data on the melting and treatment technique for obtaining nodular iron by the Mg process, the author also describes, briefly, methods of molding and coremaking, gating and feeding, heat treatment and laboratory control, and gives typical examples of castings produced. He states there is no doubt that castings in spheroidal graphite cast iron can be made consistently on a commercial basis. The author recommends that, in view of the increasing demand for such castings, and the consequent call on production capacity, the best arrangement is to equip a separate foundry, or a self-contained section of a foundry, especially for the production of such castings.

Spheroidal Cast Iron

Similar conclusions were arrived at in a paper by J. V. Bairiot and J. Berthelier, of the Information Center for Nickel, Brussels, entitled "Nickel Cast Iron and Spheroidal Graphite Cast Iron for Engineering."

On similar lines was a paper—"A Year of Practice in the Production of Spheroidal Graphite Cast Iron," by Dr. F. Canti, of the Petri Foundry, Saronne, Italy and Dr. C. Galletto, of the Italian Center of Information on Nickel. Spheroidal cast iron has been produced at the Petri foundry on an industrial scale since June-July, 1950. The mechanical properties of the iron produced (by the Mg process) are: As cast, Tensile strength 80,000 psi and elongation 0 to 2 per cent; annealed, tensile 60,000 psi and elongation 12 per cent. These minimum properties are guaranteed to the customer. Each week, from two to four treatments are made, twice a week, with tonnages ranging from 500 to 700 kg.

The batches are treated by the Ni-Mg process followed by ferrosilicon inoculation. The authors state that for industrial production the major difficulties of the Mg treatment are: Variation of the weight of metal to be treated; variation of the sulphur content; efficiency of the inoculation; quality of the base iron, varying according to the raw materials charged in the cupola. These problems can be solved by careful control of all the foundry operations. During a shortage of Ni-Mg alloy, the Cu-Mg alloy was

experimented with, but the mechanical properties obtained were not so good as with the Ni-Mg.

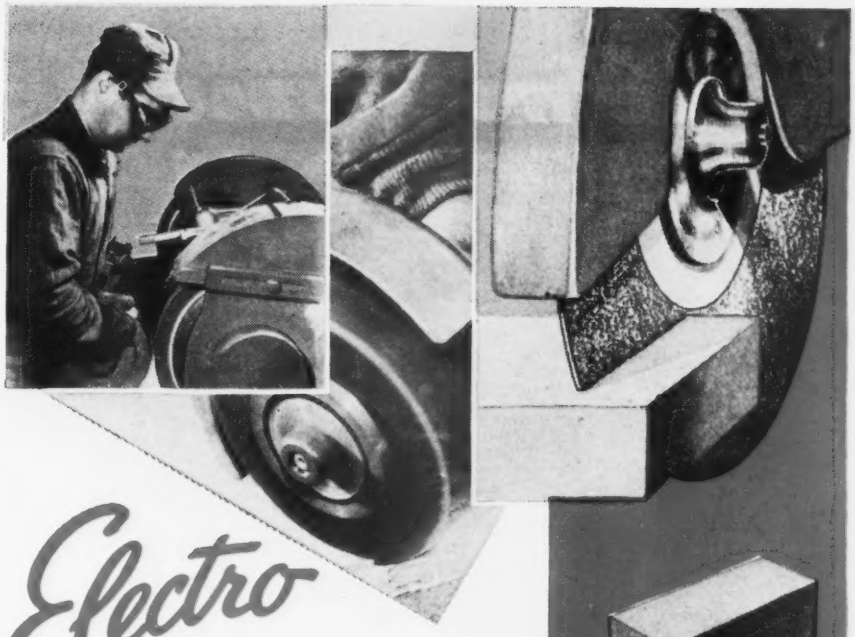
The contribution of Albert P. Gagnebin, The International Nickel Co. Inc., New York, was entitled "Ductile Iron. Its Significance to the Foundry Industry." Because the term "nodular" is used in connection with the graphite in blackheart malleable iron, the author prefers to use the term "ductile" or "spheroidal." He states that these irons have brought about a real revolution in the foundry industry. The tensile strength and elongations obtainable without great difficulties open up a wide field of utilization for ductile irons. Castings made with these irons can resist pressure, wear, heat, oxidation at high temperatures, and fatigue. The irons weld easily and are readily machined. By heat treatment, cutting tools can be used at two or three times the speed required for good quality grey irons. The capital cost of equipping a foundry for castings made of ductile irons is low.

A most lively discussion followed the presentation of these papers. Many questions were asked on points of detail, but the discussions centered mostly on theories and suggestions advanced by speakers, in an endeavor to explain the mechanism of formation of graphite nodules. No definite conclusions were arrived at, but some promising ideas were put forth, and it was agreed that the subject merited further close study and exchange of information.

Keep Risers Liquid

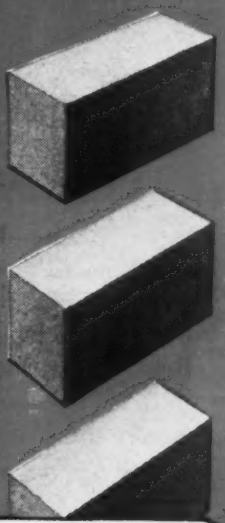
Of the three papers on risers and feeding heads, one was the official exchange paper of the American Foundrymen's Society, by J. B. Caine, technical consultant, Cincinnati, whose subject was "Risering Castings," a progress report 1948-1951, Part II. This paper was presented, in the author's absence, by W. S. Pellini. In the discussion that followed, some questions were asked on the use of liquidizers. Mr. Pellini, referring to trademarked commercial materials, said they gave little extra heat in the early stages of solidification but it is at the later stage that the heat is needed; these materials also leave a thin layer of refractory which helps. Thermit material is also used, especially for large sections.

One comment pointed out that the paper treated the question of risering mainly from an academic point of view, and what is needed is the consistent application of a true method to practical cases. Risers could often be avoided by changing the position of the gate. The aim to attain is the cheapest and simplest method to obtain a sound casting. Mr. Pellini re-



Electro agrees:

It's Take-Off That Pays Off



Whatever the *theory* of wheel quality, it's take-off that pays off. Currently, competitive tests prove that Electro Wheels *engineered to the job,* are 45% more effective!

As grinding problems and practices become more and more individual, production executives realize more and more that only those wheels that are engineered for specific purposes under individual conditions, are wholly satisfying.

Permission to survey the possibilities as to whether comparable efficiencies and economies can be achieved for you, will place you under no obligation whatever. Phone, write or wire. We'll get a competent Field Engineer to you quick!

Electro SINCE 1919

Resin Bonded ABRASIVE WHEELS FOR

CUTTING-OFF

PRECISION GRINDING

SNAGGING

GRINDING WHEEL MANUAL 645 AND SPEED CALCULATOR

Free on Request

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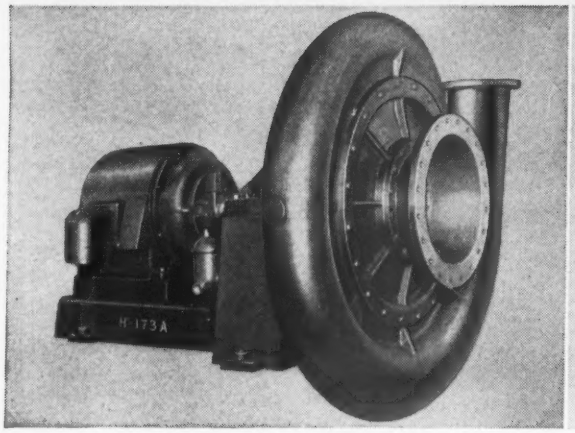
Electro Refractories & Abrasives Corp

344 DELAWARE AVENUE • BUFFALO 2, NEW YORK

Plants: Buffalo, N. Y. Cap-de-la-Madeleine, P. Q. Canada · Regional Warehouse: Los Angeles 58, Cal.

Take no chances on V-P-L



CENTRIFUGAL

Type OIB Centrifugal Blower for cupola service. Capacity 15,220 cfm.

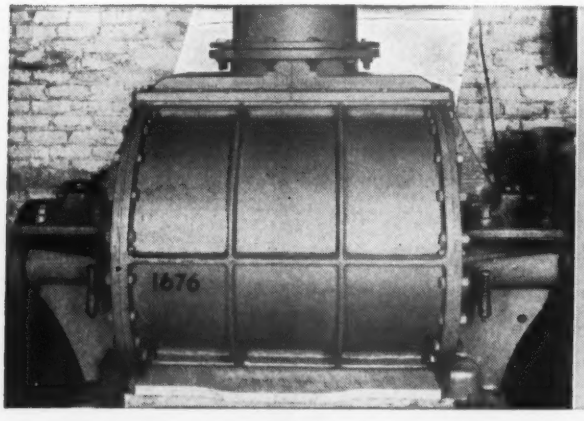
V for Volume—P for Pressure—L for Low power cost.

Those are three essentials for adequate blower performance to keep your cupolas going at top capacity to meet today's urgent production demands. You're sure of all three, with Roots-Connersville Blowers.

That's the case whether your plant calls for Centrifugal or for Rotary Positive units. You can have either type, from the exclusive R-C *dual-ability line*. Capacities range from 5 cfm to 100,000 cfm, thus permitting the selection of a size closely matched to your specific demands. Frequently, this freedom of choice saves time, cost, space, weight and power.

R-C engineers will gladly help you select the right blower with the V-P-L needed to keep production moving.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Madison Avenue, Connersville, Indiana



ROTARY

Type RCS Blower in midwestern foundry, for cupola service. Capacity 4,400 cfm.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

plied that in gray iron one need not worry about certain types of castings but with many other types, and with steel soundness is essential; risers are necessary and the calculations given in the paper are of great help.

The contribution from Victor Paschkis, technical director of the Heat and Mass Flow Analyzer Laboratory, Columbia University, New York, was entitled "A Novel Method for Solidification Studies." The paper states that the properties of a casting depend largely upon its thermic history from the time of pouring to the shaking out. Many factors are involved, and the thermical study should be made, starting from simple cases and arriving at general cases. The heat and mass flow analyzer, as a practical means of computation, can be put to good use to find laws and relationships. But the results need to be spot checked by direct temperature measurements, and the latter should always be carried out together with observations of casting structure. Mr. Pellini said that the author's equipment was in use in many fields, and he was impressed by the accuracy of the measurements obtained. In the foundry field the method gave good results and saved money, especially with simple forms of casting; much more work must be done with the more complicated shapes.

Calculate Riser Size

In the exchange paper from the Dutch Foundry Technical Association, entitled "Dimensioning Risers and Feeding Heads," J. S. Abcouver, of Werkspoor N. V., Utrecht, the Netherlands, explained a formula for calculating risers and feeding heads. In his conclusions he said: (a) For the same superheat, mold and metal, Chorinov's claims are in accord with the end of freezing times of the heat and mass flow analyser laboratory. (b) Superheat is of paramount importance on the start of the freezing time, and in a lesser degree on the end of freezing time and feeding. (c) Risers and heads can be calculated mathematically by a simple equation given in the paper. (d) It is of little use to calculate risers or heads for a whole casting that can be only partly fed. The principles of how to feed a casting have to be solved first. (e) It is good practice to dispense with risers and heads where possible, wall thickness, height and the kind of mefal and mold being the limiting factors. Answering to a question, the author stated that the formula could be used for castings weighing as much as 70 tons.

"Some Recent Danish Experiments with the C-Process" was the subject of a paper by Professor O. Hoff, of

the Technical High School, Copenhagen, Denmark. The process has been tried at the Valentin Aage Moller Co. of Copenhagen, and some difficulties had to be surmounted to find the right type of sand and the method of preparing the molds. The author believes that for a minimum batch of parts, and providing that the dimensions of the castings do not exceed 600 by 600 mm. for a weight of 100 Kg., the process can compete with the usual methods of molding. The author's firm uses the process for castings for auxiliary motors for bicycles.

Dr. Ing. Habil C. W. Pfannenschmidt, foundry director, Klockner Humbolt Deutz, A. G., Germany, contributed a paper on "Desulphurising in the Cupola and the Electric Furnace." The author makes special reference to the basic-lined cupola on the basis of early German and recent American experiments of S. F. Carter. He mentions the possibilities of adding Mn oxides to the charges, and also the soda ash process. Also the recent experiments of J. H. Rehder with Mg. Mention is made of results with the basic-lined arc furnace.

(To be concluded next month)

Apprentice Training for Defense Urged

A plea to promote apprentice training in the foundry industry as an aid to the country's defense was made by W. F. Patterson, director, Bureau of Apprenticeship, U. S. Department of Labor, before the recent 31st annual convention of the International Molders and Foundry Workers Union of North America, held in Minneapolis.

Replying to the contention that young men do not want to enter the foundry industry, Mr. Patterson said that if foundries will continue to improve working conditions, and if rewards are attractive and the apprentices are assured of learning a trade that will give them an opportunity to use their initiative and intelligence, then young men will go into the industry.

Admitting that the military draft is placing an added burden on apprenticeship, Mr. Patterson stated that the Federal Committee on Apprenticeship, the top labor-management policy group, has recommended that bona fide apprentices with six months or more of training be deferred to completion of apprenticeship upon certification by joint apprenticeship committees, employers, or other appropriate authorities.

HAUSFELD

METAL MELTING FURNACES

FOR

BRASS—ALUMINUM—MAGNESIUM

AND ALL OTHER NON-FERROUS METALS AND ALLOYS

GAS OR OIL FUELS

TILTING AND NON-TILTING TYPES

SINGLE AND MULTIPLE BURNERS

AUTOMATIC PROPORTIONING SINGLE VALVE CONTROL ASSURES UNIFORM RESULTS WITH MAXIMUM ECONOMY OF OPERATION.

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

5

good reasons why you profit from using a dustube ... for solving your dust problems

1. More Efficient Dust Removal— On-the-job performance proves that American Dustube Collectors meet the most exacting requirements for thorough dust control. The Dustube traps all dry dusts, regardless of particle size or concentration, with nearly 100% efficiency.

2. More Economical Operation— Operating costs are confined to supplying power for the fan and shaker, and the occasional replacement of an inexpensive cloth tube. Power costs are exceptionally low.

3. Reduced Maintenance Costs— Filter tubes can be inspected readily without being removed. When infrequent tubes replacements are required, one man can make the change in a few minutes without tools.

4. Longer Cloth Life— As the filter tubes are never under tension in a Dustube, wear on the cloth is reduced to an absolute minimum. There are no frames or screens to abrade the cloth and only the very fine float dust reaches the tubes.

5. More Thorough Shaking— Shaking periods are shorter and less frequent in a Dustube due to its perfected, efficient method of removing dust from the tubes. This results in lower operating resistance, longer cloth life and direct savings in horsepower.

AMERICAN'S NEW CATALOG NO. 72-B describes the operating advantages of the Dustube in detail. Write today for your copy.

American WHEELABRATOR & EQUIPMENT CORP.

dustube® COLLECTORS

505 S. Byrkit St., Mishawaka 2, Ind.

OBITUARY

WILLIAM E. RAYEL, 71, special representative, Archer-Daniels-Midland Co., Foundry Products Division, Cleveland, died Sept. 12, at his home in Lakewood, O. Mr. Rayel was born in Crestline, O. and at the age of 14 entered the Burch Foundry Co. there, later becoming foreman. He worked in foundries throughout the country until 1914 when he became associated with Ferro Machine & Foundry Co., Cleveland. Two years later he joined Archer-Daniels-Midland Co. as a salesman of foundry products.

* * *

Newlin T. Booth, 64, president, Deemer Steel Casting Co., New Castle, Del., died there Sept. 19. Mr. Booth joined Pennsylvania Steel Casting & Machine Co., Chester, Pa., as a chemist in 1907. Later he was special apprentice, Carnegie Steel Co., Homestead, Pa. In 1911 he became assistant to the president, Penn Seaboard Steel Corp., Chester, Pa., and was superintendent of the steel foundry, Bethlehem Steel Corp., Steelton, Pa., from 1918 to 1923 when he became president of the Deemer company.

* * *

C. L. Best, 73, board chairman, Caterpillar Tractor Co., Peoria, Ill., died Sept. 22, in San Francisco. In 1910 he organized his own farm machinery factory in Elmhurst, Calif., and began making gasoline wheel tractors. He continued as president of the C. L. Best Tractor Co. until 1925, when it was merged with Holt Mfg. Co., Stockton, Calif., and Peoria, Ill., to form Caterpillar Tractor Co., and Mr. Best became chairman of the new company.

* * *

John P. Roberts, 43, since 1945 assistant general manager of the service sales division, Timken Roller Bearing Co., Canton, O., died suddenly Sept. 19, as the result of an automobile accident near Spruce Pine, N. C. Mr. Roberts, who joined the company in 1935, was formerly Pittsburgh district salesman and Minneapolis branch manager for the company.

* * *

James A. Murphy, 82, widely known foundryman, died at his home in Hamilton, O., Oct. 6. He was born in Ireland and learned the molding trade in Boston. Later he held positions as foreman and superintendent in Erie and Franklin, Pa., Carteret, N. J., Cleveland and Hamilton, O. In addition to developing many advanced ideas in various fields of foundry

practice he won a production record during World War I that it is believed never has been equalled. Every day for a period of a year he cast a complete set of castings for a 2500-hp triple expansion engine for the Liberty ship fleet. He served as secretary of the Associated Foundry Foremen's Association for several years before the body was affiliated with the American Foundrymen's Association. Equally gifted as speaker and writer, he contributed many technical articles to FOUNDRY. In recent years he conducted Jas. A. Murphy & Co., manufacturers of aftercoolers, spray guns and other compressed air products of his design.

* * *

Leroy Hooten, 46, foundry foreman, the Hamilton Foundry & Machine Co., Hamilton, O., died Sept. 11. Mr. Hooten joined the company in 1941 as an apprentice molder and became foundry foreman last year.

* * *

B. C. Edkin, former president, Erie Bronze Co., Erie, Pa., died Sept. 9. Mr. Edkin was president of the company until 1945 when he sold the business and retired.

* * *

Daniel H. Slonaker, 78, former president and general manager, the National Roll & Foundry Co., Avonmore, Pa., died Sept. 18. Mr. Slonaker retired in 1942.

* * *

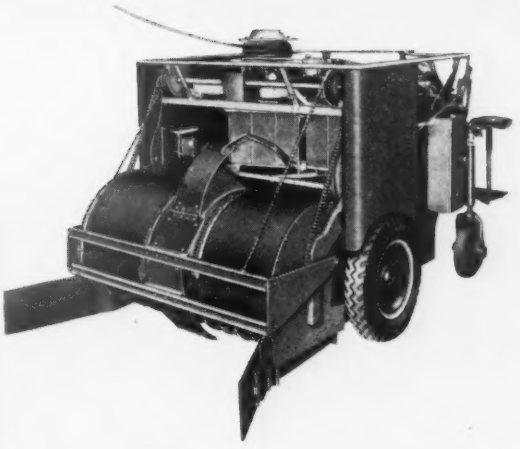
Isadore E. Goodman, 59, co-owner of the Wayne Foundry & Stamping Co., and the Ductile Chrome Processing Co., Detroit, died there Sept. 20.

* * *

Aloysius J. Fischer, 55, for the last two years superintendent of the foundry, O P W Corp., Cincinnati, died Sept. 18.

Booklet Condenses Report Of British Foundry Team

The Council of Ironfoundry Associations, 14 Pall Mall, London, has published a popular version of the report of the gray iron productivity team that visited United States foundries about two years ago. Entitled "What's Going On Over There?" the illustrated booklet highlights production methods in this country, pointing out that productivity of American foundrymen is 46 tons per man per year as compared with 24 tons per man per year for British foundrymen. Suggestions are made as to how the British foundry industry can increase its output. Booklet is profusely illustrated, is printed in two colors and contains 12 pages.



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good reasons why you profit from using a

Sandmaster

. . . for complete sand conditioning

1. Better Sand Quality—The extra-thorough cutting, mulling and screening action of the Sandmaster gives sand a "Velvet-Like" texture that makes molding easier and reduces rejects. There is no other portable sand conditioning unit that conditions the sand so thoroughly.

2. Thorough Magnetic Separation—A high efficiency magnetic separator removes all sizes of shot and tramp iron before screening.

3. Effective Screening— Particles of coke, charcoal, cores, gaggers, core rods, etc., usually present in any sand heap, are effectively removed. Screening out these impurities reduces the percentage of gas blows, scabs, rough castings and broken molds. Screening also opens up, fluffs, aerates and cools the hot sands, permitting gases to escape.

4. Reduced Bond Requirements—The mulling action imparts a superior quality to the sand and permits conditioning of synthetic sand quickly and with less bond additions.

5. Improved Casting Appearance—The soft, fluffy, well-conditioned molding sand imparts a finer finish to the castings.

BULLETIN NO. 45 explains why the Sandmaster will do a better job of sand conditioning for you. Write today for your copy.

SAND CONDITIONING HEADQUARTERS FOR 43 YEARS

American WHEELABRATOR & EQUIPMENT CORP.

SANDMASTER®

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D3184

Research Is Important

(*Concluded from page 91*)

used in connection with the microscope which makes it possible to select and determine the hardness of extremely small areas of a metallic substance. The metallographic department includes a specimen preparation room and an air-conditoned dark room.

Important adjunct of the Research and Development department is a spacious library in charge of a trained librarian. It provides ample shelf space for over 2000 volumes and numerous periodicals and technical reports. Main library room also is used for large conferences where adequate table space and large seating capacity are required. Facilities are available for the projection of slide or motion picture films.

As indicated earlier the office building is adjacent to the laboratory and experimental foundry building. The office of the director of the department faces on the Delaware river, and is spacious enough for a conference table where he gathers frequently with the staff to discuss past results and future plans. The building includes offices for the engineers and metallurgists who head each section as well as an office for the secretarial force. Office space for other members of the development staff is provided in the laboratory building.

The plant development section acts as a liaison between the research departments and the plants in carrying out development projects. Some of the work of this section is carried out in the experimental foundry where the electric furnaces, centrifugal spinning machines and annealing furnaces can be used to good advantage. Other phases of the work involving the operation of cupolas and plant production of pipe and fittings and other tubular castings are carried out in the plants.

In conclusion, it may be of interest to cite some of the accomplishments of the Research and Development department. Early in World War II the Philadelphia Ordnance District requested the firm to develop if possible a centrifugal method of casting steel trench mortar barrels. Since sometime prior to the war period considerable experimental work had been done and recorded on a similar type of problem, the Research and Development department was able to start immediately and intensify the experimental program. As a result it was found that 60-mm and later 81-mm mortar barrels could be successfully cast by the centrifugal process in metal molds. Using that process the Burlington plant produced more than 50,000 of 60 and 81-mm mortar barrels. Modifications in the basic process of metal-mold centrifugal casting also enabled the plant to produce war materiel such as steel recoil cylinders, hollow steel billets and alloy iron piston ring tubes. The department developed the dual-metal centrifugal casting process whereby two different metals cast in the same mold are bonded metallurgically. Details of that process were described in detail in the July and August issues of FOUNDRY by M. L. Samuels and Dr. A. E. Schuh.

With such complete experimental foundry facilities it is possible to try out experimental methods on a small scale, and then if the result is sufficiently promising the process can be carried on in a larger or pilot plant basis right in the same foundry. Pilot plant operation is distinctly advantageous as it affords an opportunity to observe the process at or near the scale at which it would be used in plant production. Secondly, shortcomings show up in the pilot plant stage that must and can be remedied before going into full-scale production and sometimes certain disadvantages show up at this stage which would make it impossible to use the process in plant production.

Due to dimensional and compositional variations in the many types of centrifugally cast tubular products made by the Special Products division a large amount of development work is required for each new product. Factors involved include design of the metal mold, proper kind and thickness of mold coating, charging and melting procedure for the furnace, mold speed, temperature, heat treating cycle and a number of others. Many of the laboratory facilities are called upon to determine the best combination of all factors. Many more projects are concerned with the manufacture of cast iron pipe and fittings to maintain high quality and low manufacturing costs.

QUICK UNLOADING and stockpiling of 675-lb annealing pots is accomplished by Union Malleable Mfg. Co., Ashland, O., through use of a crawler mounted crane with a 36-in. magnet. This yard crane is kept busy on a number of jobs: unloading of scrap and pig iron, loading charging boxes, and handling machinery. Photo courtesy Thew Shovel Co.

Minerals Yearbook

Department of the Interior, Bureau of Mines, Washington, has published a new volume of the *Minerals Yearbook*, a basic source of information on domestic and foreign mineral commodities. It contains data for 1949 as well as comparative data for earlier years. The commodity reviews, written by specialists in their respective fields, deal with metals, nonmetallic minerals, and mineral fuels. Copies are available for $4.50 from Superintendent of Documents, U. S. Government Printing Office, Washington 25. Individual chapters are available at 5 to 30 cents each.

AJAX

Lo-Veyors prove that

the cheapest way to handle sand is NOT to handle it

It is a generally accepted fact in the foundry industry that 100 pounds of material are handled for every 10 pounds of castings produced. There is no money in moving foundry sand with wheelbarrows.

That's why foundrymen are cutting costs and speeding up production with Ajax Lo-Veyors.

They are self-contained, vibrating conveyors ready to set in place and use. Easily installed on your floor, below your floor or suspended from wall or ceiling.

Reciprocating drive unit is completely enclosed...no exposed bearings or idler pulleys subject to rapid wear by sand.

Low first cost, low operating cost, low maintenance cost...it will pay you to look into Ajax Lo-Veyors.

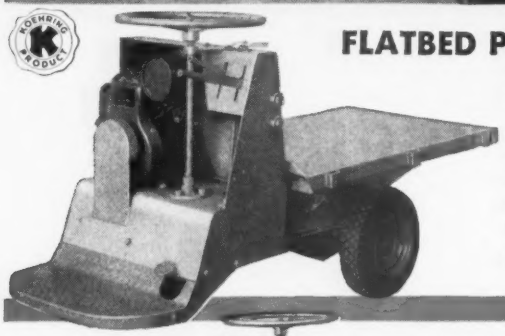
AJAX FLEXIBLE COUPLING CO. INC.

204 English St., WESTFIELD, N. Y.

LABOR-SAVING Moto-Bug

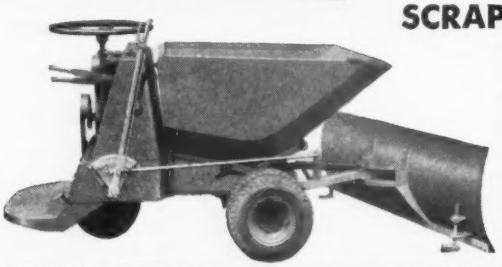
has adjustable FORK LIFT

With 4 interchangeable units, Kwik-Mix Moto-Bug makes man-hours more productive on all kinds of material-handling jobs. Fork Lift, hydraulic pump operated, transports pallets and crates . . . has adjustable-width forks.



FLATBED PLATFORM carries 1200-lb. load on sturdy 32" x 4 ft. bed. Platform tilts for easy pull-away when unloading . . . has stake pockets for adding sideboards. With full power forward and reverse, there's *"no push, no pull"* necessary to travel, back up, or spot.

10 CU. FT. HOPPER hauls coke, scrap, concrete and other bulk materials. Standard-make 4 h.p. gas engine takes full load up 20% ramps, grades. Operator rides on rear step. Plenty of traction and flotation . . . dual steer wheels standard, dual drive wheels optional.



SCRAPER BLADE for plowing snow, spreading cinders, etc., sets at any angle, is supported by swivel shoe at each end. Hand lever lifts blade for travel clearance. Not necessary to remove hopper. Get more Moto-Bug facts from Kwik-Mix distributor . . . or write.

Mail Now to: KWIK-MIX COMPANY, Port Washington, Wis.

Send full information on Moto-Bug with: ☐ Fork Lift ☐ 1200-lb. Flatbed ☐ 10 cu. ft. Hopper ☐ Scraper Blade

NAME ..... TITLE .....

COMPANY ..... DEPT. OR DIV. .....

STREET .....

CITY ..... STATE .....

FO KM137

KWIK-MIX "NO PUSH—NO PULL" Moto-Bug

Quad City Founders To Hold Conference

Quad City Chapter of the American Foundrymen's Society will hold a regional foundry conference at the Blackhawk Hotel, Davenport, Iowa, Nov. 8-9. Program of the two-day conference will feature discussion of problems connected with supervision, cupola practice, foundry mechanization, cores, sand, gates and risers. The general theme will be "Better Castings Through Knowledge."

A. D. Matheson, French & Hecht Division, Kelsey-Hayes Wheel Co., Davenport, will serve as chairman; W. C. Bell, Frank Foundries Corp., Moline, Ill., as co-chairman; and Eric Welander, Union Malleable Iron Works, East Moline, Ill., as program director.

In addition to two days of technical sessions, the program includes a dinner Thursday evening at which Col. Jack Major, Paducah, Ky., will speak. The detailed program follows:

Thursday, Nov. 8

9 a.m.—Registration

10 a.m.—Chairman, W. C. Bell, Frank Foundries Corp. Opening address by W. L. Seelbach, president, American Foundrymen's Society

10:45 a.m.—Chairman, R. E. Miller, John Deere Planter Works. "You Can Help," George Dreher, executive director, Foundry Educational Foundation

12:15 p.m.—Luncheon—Chairman, W. C. Bell, Frank Foundries Corp. "Importance of Supervision in Today's Problems," John T. Brown, J. I. Case Co.

2 p.m.—Chairman, Roy P. Ray, J. I. Case Co. "Cupola Practice," Walter Jaeschke, Whiting Corp.

3:40 p.m.—Chairman, C. C. Fyd, John Deere Harvester Works. "Foundry Mechanization," Emil Schmidt, the Studebaker Corp.

6:30 p.m.—Chairman—A. E. Matheson, French & Hecht Division, Kelsey-Hayes Wheel Co. "Taxes, Women and Hawgs," Col. Jack Major, Paducah, Ky.

Friday, Nov. 9

10 a.m.—Chairman, C. R. Marthens, Marthens Co. "Modern Methods of Producing Cores," Zigmund Madacey, Caterpillar Tractor Co.

12:15 p.m.—Luncheon—Chairman, A. E. Matheson, French & Hecht Division, Kelsey-Hayes Wheel Co. "The Arsenal's Role in National Defense," Col. W. W. Warner, commandant, Rock Island Arsenal

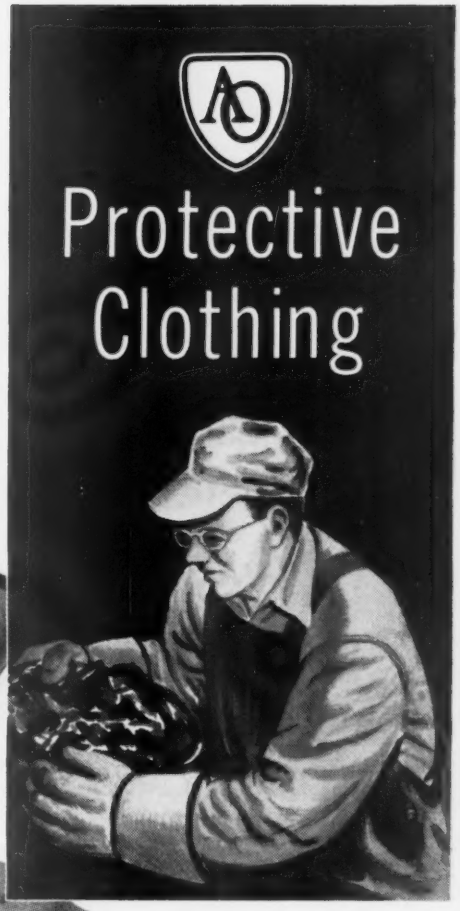
2 p.m.—Chairman, E. C. Zirzow, Werner G. Smith Inc., Cleveland. "What Do We Know About Sand," John B. Caine, foundry consultant

3:40 p.m.—Chairman, Boyd L. Hays, Union Malleable Iron Works. "Gating and Risering," R. P. Schauss, Werner G. Smith Inc.

Stainless Steel Data

Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, has published a new data and handbook on stainless steel. Containing 120 pages 7½ x 10½ inches, it discusses about 40 different types of stainless steels made by the firm. The book is divided into seven chapters of which the first deals with selection of the proper steel for a given application. Subsequent chapters deal with each type of stainless steel with information on heat treating, fabrication and special conditions in service.

AO Steel-Stapled **HAND PROTECTION** — Materials Handling Equipment for the HARDEST SERVICE!



AO makes a complete line of steel staple-reinforced, chrome-tanned cowhide gloves, mittens and hand pads. All are made to withstand hard wear on the roughest jobs yet remain flexible and comfortable. Your nearest AO Safety Product Representative can supply you with these BIG VALUES in protection and serviceability.

RECOMMENDED USES:

- **AO 1644 GLOVE** — For heavy operations in foundries and steel mills, heavy casting, handling of rough scrap.
- **AO 1655 GLOVE** — For grinding and rough operations.
- **AO 1660 GLOVE** — For foundry work and grinding.
- **AO 5X138 GLOVE** — For use in steel mills on flying shears, handling rough scrap, etc.
- **AO 5X264 GLOVE** — For handling small castings, rough stock and similar.
- **AO 1674 MITTEN** — Reversible, may be worn on either hand. For handling steel sheet stock, scrap, wheel castings, rough material.
- **AO 1201 HAND PAD** — For steel scrap and rough steel.

AO's Industrial Vision Program increases *production*, decreases *accidents. Write today for free booklet "Improved Industrial Vision."*

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NEWS VIEWS

↑ **"SCRAPPY": Symbol of a nationwide advertising campaign to "get out the scrap," this model of "Scrappy" poses at Washington. Business Paper Advisory Committee of the Advertising Council recently opened a volunteer campaign to speed scrap to foundries and steel mills. Left to right: R. D. Mossman, Jones & Laughlin Steel Corp., co-ordinator of the Council's campaign; Director C. E. Wilson, Office of Defense Mobilization; "Scrappy"; NPA Administrator Manly Fleischmann; T. S. Repplier, president, the Advertising Council.**

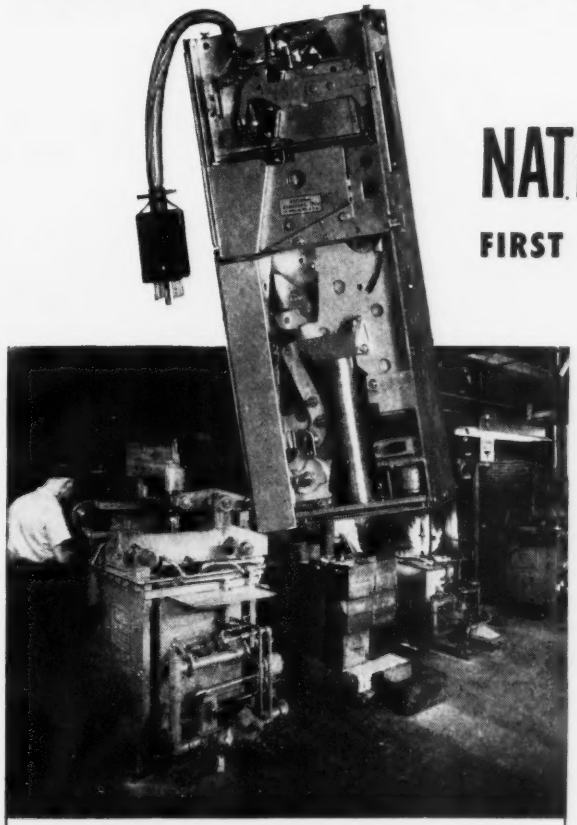
↑ **FOUNDRY RECRUITS: First of a group of German expellees from Iron Curtain countries arrive in New York, bound for jobs with Grede Foundries Inc., Milwaukee. Shown welcoming the young men are, left to right: J. J. McTigue, Displaced Persons Commission; Werner Wartenberg and R. B. Benjamin, American Federation of International Institutes.**

↑ **NEW FACILITIES: Kirk & Blum Mfg. Co., Cincinnati, fabricator and erector of dust collecting and fume removal systems, recently completed moving to larger quarters in that city. Its present plant, adapted to further expansion, is a one-floor plan brick structure with about 120,000 square feet. Extensive modernization, some of which is shown here, has been completed and more is to follow.**

← **SLAG PIT CLEANING: Replacing slow hand labor and overhead crane handling of slag, this Allis-Chalmers tractor makes easy work of cleaning slag pits in a bank of 14 open-hearth furnaces. It can load from three or four pits, minimizing the number of moves the ladle crane makes in spotting slag pans.**

KUX

FIRST NAME IN DIE CASTING MACHINES



MODEL **HP-20**
Hydraulically operated die casting machine for production of aluminum castings.

USED BY

NATIONAL REJECTORS, INC.

FIRST NAME IN COIN CONTROL DEVICES

The desire for a soft drink or a candy bar, . . . a vending machine and a coin. They're the ingredients it takes to make "magic with a nickel!" Right before your eyes, a miracle of miracles takes place. The proper change is returned plus the refreshment . . . all due to a remarkable behind-the-scenes mechanism made by NATIONAL REJECTORS, INC.

Using KUX die casting machines, NATIONAL REJECTORS, INC. turns out thousands upon thousands of intricate, extremely sensitive coin control devices that automatically check the coin for authenticity, return the exact change . . . and please your appetite!

Does YOUR PRODUCT require pin-point accuracy? Quality die castings often provide the difference between success and failure . . . profits and losses. KUX, first name in die casting machines, can make that difference for YOU!

Write for illustrated catalog showing complete line of KUX Die Casting Machines.

KUX MACHINE COMPANY
6725 N. RIDGE • CHICAGO 26, ILLINOIS

KUX

FIRST NAME IN DIE CASTING MACHINES
SELECTED BY FIRST NAMES IN INDUSTRY

Industry BRIEFS

NEW plant of Ohio Ferro-Alloys Corp. at Brilliant, O., is in operation. Plant incorporates three large electric furnaces equipped to produce various grades of silicon alloys, ferrochromium and other alloys. Ferroalloy briquets and other alloy additives used by iron and steel foundries also will be produced.

* * *

Fairbanks Co., New York, producer of industrial trucks, valves, casters, wheels, etc., will build a new foundry at Binghamton, N. Y., adjacent to the firm's present foundry which eventually will become the plant machine shop.

* * *

Harbison-Walker Refractories Co., Pittsburgh, through a wholly owned subsidiary, has acquired the Warm Springs, Calif., plant of LaClede Christy Co., Chicago. Harbison-Walker also has organized a Brazilian subsidiary, Harbison-Walker Minerios Ltda., which has mining rights for Brazilian magnesite.

* * *

Bakor Oil Co., 82 East Main St., Chicago Heights, Ill., is now engaged exclusively in the manufacture of core oil. The company formerly was known as Chicago Heights Paint & Varnish Co. William C. Bay is president and Bernard Comstock sales manager.

* * *

Depew Foundry Corp., Buffalo, has been incorporated by Mildred Ruth, 471 Koons Ave., Arlene G. Misener, 501 Morgan Bldg., and Celia Tully, 73 Saint James Plaza, all of Buffalo.

* * *

Link-Belt Co., Chicago, was judged as having the best annual report of the materials handling equipment category, by the independent board of judges in the *Financial World* survey of annual reports. Black Sivalls & Bryson Inc., Kansas City, Mo., was second in the material handling equipment category, and Chain-Belt Co., Milwaukee, placed third.

* * *

Sinclair-Collins Valve Co., Cuyahoga Falls, O., recently completed a new $300,000 foundry for production of bronze castings. The company manufacturers air-operated valves used primarily in the rubber and plastics industries. J. E. Collins is president.

* * *

Grede Foundries Inc., Milwaukee, and Lake Shore Engineering Co., Iron Mountain, Mich., have purchased the Kingsford plant of the Ford Motor Co. The purchasers have formed a holding company, Kingsford Corp., which will rent or lease parts of the former Ford plant to other industries.

* * *

Norton Co., Worcester, Mass., and Behr-Manning Corp., Troy, N. Y., have formed Norton Behr-Manning Overseas Inc., Worcester, to handle export business and direct subsidiary plant operations of the two operations throughout the world.

* * *

Vulcan Mold & Iron Co., Latrobe, Pa., has purchased a 30-acre tract near Riverside, N. J., which may ultimately be used for expansion of the company's ingot mold facilities. Company also has completed a new ingot mold foundry at Lansing, Ill.

* * *

Federated Metals Division, American Smelting & Refining Co., has purchased the Frictionless Metal Co., St. Louis, and will continue the manufacture and sale of Frictionless bearing metal.

* * *

Foremost Foundry Supply Co., Milwaukee, has been incorporated to deal in all kinds of foundry supplies. Incorporators are LeRoy E. Rinzel, Mona M. Moss, and Alice Szezerbiak.

* * *

Wheelco Instruments Co., has moved its western division sales office to 2320 Milwaukee Ave., Chicago. Office is under the direction of R. A. Schoenfeld.

* * *

Safety Clothing & Equipment Co. has moved from 7016 Euclid Ave., Cleveland, to 1990 E. 69th St.

* * *

DeWalt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Co., New York, has acquired

(*Concluded on page* 206)

FLYING SAUCER?: No, it's a 27,000-lb, 120-in., bronze-rimmed, cast-steel leaf for a butterfly valve manufactured in the Sunnyvale, Calif., plant of Westinghouse Electric Corp. The valve will control flow of water through a penstock leading to a large waterwheel generator in a southern California hydroelectric power generating station. The holes shown are on the downstream face of the leaf. The upstream face is solid cast steel. The four protruding legs are steel supports temporarily welded to the structure to speed machining and other manufacturing operations

NO MORE *Fishing Around*

FOR SHOT AND GRIT
ONCE YOU'VE TRIED METAL BLAST

Metal Blast customers are not one-time buyers. Whether it's shot or grit; whether the best for the purpose is ANNEALSHOT or SUPER-ANNEALSHOT, repeat orders are customary.

The reason is simple. ANNEALSHOT is the finest hard shot and grit made even though it sells at chilled shot prices.

SUPER-ANNEALSHOT is the perfected *malleable* shot and grit. Each has its place.

It's the greater durability that our customers like. And it's the principal reason why Metal Blast has become the largest independent producer of abrasives in the country. After you read the trial order guarantee, you need not hesitate.

METAL BLAST, INC.
872 East 67th St. • Cleveland 13, Ohio

TRIAL ORDER
GUARANTEE

If you don't agree that SUPER-ANNEALSHOT and GRIT are the best and most economical malleable abrasives you've ever used—return the unused quantity for refund—AT OUR EXPENSE.

Metal Blast
Malleable
SUPER ANNEALSHOT
METAL BLAST, INC.
CLEVELAND, OHIO

ANNEALSHOT — The finest hard shot and grit made, but sells at chilled shot prices.

SUPER-ANNEALSHOT — The perfect *malleable* shot and grit.

(*Concluded from page* 204)

the Monarch woodworking machinery line of American Saw Mill Machinery Co., Hackettstown, N. J.

* * *

Metal Removal Co. has its general offices and research laboratories located in a new building at 1546 North Orleans St., Chicago. A display room features abrasive and other metal removing tools.

* * *

Osborn Mfg. Co., Cleveland, has appointed Inesco Inc., 3050 East Slauson Ave., Huntington Park, Calif., exclusive representative for its foundry molding equipment. Otto H. Rosentreter is Inesco president.

* * *

Day Co., manufacturer of dust control equipment, has appointed R. Dykstra & Co., 7701 Mack Ave., Detroit 14, representative in the Michigan territory.

* * *

Hicks-Cline Inc., Kingston, N. Y., recently incorporated as a foundry and machine shop, has changed its name to Ulster Foundry & Machine Corp.

MAGNETIC CLUTCH CONTROLLED

For safe, fast and efficient unloading of grain, corn, soybeans and similar bulk materials from box cars, the perfect answer is the STEARNS Magnetic Clutch Controlled Power Shovel. A unique one-man shovel completely controlled by the man in the car, safer operations result — when the operator releases his pressure on the "dead-man" switch, the clutch disengages and the scoop stops. A second safety feature prevents accidents beyond the control of the operator — the scoop automatically stops when the safety stop trips the limit switch in the swivel sheave.

With the control in the hands of the operator, unloading time can be cut up to 30%. This means lower labor costs for more cars can be unloaded each day.

STOPS THIS!

AND THIS!

Descriptive literature available describing single and double units. Write for your copy today.

Foremost in the Magnetic Field

Stearns MAGNETIC INC.

662 S. 28th ST., MILWAUKEE 46, WISC.

Northwest Chapters Hold Regional Conference

The three American Foundrymen's Society chapters of the Pacific Northwest — Oregon, Washington and British Columbia—joined in sponsoring a regional foundry conference, Oct. 5-6, at Vancouver, B. C. Attendance totaled 150. Friday's activities, which featured a fellowship hour and conference dinner, were under the chairmanship of William Armstrong, professor of metallurgical engineering, University of British Columbia, Vancouver, and chairman of the local AFS chapter.

These events were held at Hotel Vancouver and the principal speakers were William W. Maloney, secretary-treasurer of AFS and I. R. Wagner, Electric Steel Castings Co., Indianapolis, and national vice president, whose talk was entitled "Tools, Techniques and Taxes." Toastmaster was Oscar R. Olson, chairman of the metal trades section of the Canadian Manufacturers Association.

Shows Metal Penetration Film

Saturday's technical sessions were held at the University of British Columbia and were opened with an address of welcome by Dean Goard, principal of the Vancouver Vocational Institute. Saul F. Gertsman, Dominion Department of Technical Survey, presented a film on "Metal Penetration in Steel Foundry." Lovick P. Young, A-1 Steel & Iron Foundry Ltd., Vancouver, B. C., served as chairman. A. M. Ondreyco, Vulcan Foundry, Oakland, Calif., and a national director of AFS, followed with a discussion of "Modern Cast Iron Manufacturing —Prospectives and Application."

Luncheon followed at the University Faculty Club at which Sandy Dickson, Dickson Foundry Co., Vancouver, B.C., was chairman and Thomas Cowden, William McPhail & Sons, Vancouver was toastmaster. Featured speaker was Dr. H. J. McLeod, dean of engineering of the University.

Technical sessions continued in the afternoon under the chairmanship of Prof. William Snyder, University of Washington, Seattle. Speakers were Norman Terry, a past president of the Canadian Society of Cost Accountants, whose talk was entitled "The High Cost of Castings." He was followed by Lawrence Pridmore, International Molding Machine Co., LaGrange Park, Ill., who discussed and also demonstrated "Techniques of Core Blowing." The group was then taken on a conducted tour with demonstrations of the model plan of

Fraser river delta area at the university.

The two-day program was concluded with a party, the members of the British Columbia Chapter serving as hosts, at the Sports Pavilion, Stanley Park, to which wives of the attendants were also invited.

Book Review

Guide To Foreign Sources of Metallurgical Literature by John T. Milek; 95 pages, 8 x 11 in.; loose-leaf ring binder; published by Richard Rimbach Associates; 921 Ridge Ave., Pittsburgh 12, Pa.; price $2.50 postpaid.

This guide has been compiled as an aid to those seeking information on metallurgy published in the foreign literature. Material is presented in nine sections: A—Metallurgical Associations, Societies, Institutions, and their addresses. B—Metallurgical Periodicals, Transactions, Proceedings. C—Metallurgical Abstract Services. D—Foreign Standardizing Organizations. E—Statistical Sources. F—Directories of Metallurgical Industries. G—Metallurgical Books. H—Metallurgical Bibliographies, Technical and Special Reports. I—Metallurgical Abbreviations.

The guide provides leads and answers to hundreds of questions pertaining to foreign metallurgical information. For example, metallurgists and literature searchers checking literature on a specific subject must include foreign references. The books listed in section G have been classified under 52 subject headings to facilitate searching. The fifty-odd bibliographies compiled in section H serve as useful literature tools and will save many hours of searching on a specific subject. The other sections are equally valuable mines of information.

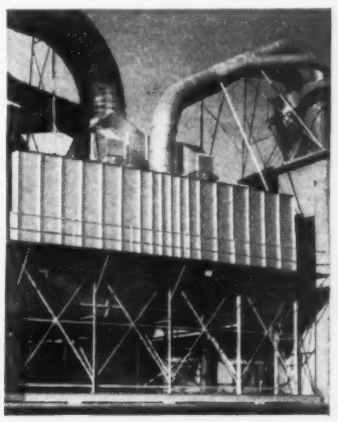
October Article Revisions

In the article, "Correlation of Structure and Test-Bar Properties of 85-5-5-5 Alloy," starting on p. 120, October issue, these corrections should be noted: In Fig. 6, "Navy ⅝" W-W" should be "Navy ⅝" W-C"; per cent elongation of 30, 40 on ordinate of Fig. 9 should be 50, 60; in Fig. 12 caption, "small amount of fines, coppery areas" should read "small amount of fine, coppery areas." Reference to particles as "slightly coarse," p. 228, second paragraph, should be "slightly coarser." At end of first paragraph, p. 229, "Fig. 10" should be "Fig. 9." Other references this page to Figs. 6, 7, 8, 9, 10, 11 should be Figs. 3, 10, 11, 7, 8, 9, respectively.

Dust is a serious threat to top-efficiency operation of your plant—but DRACCO DUST CONTROL EQUIPMENT can supply the positive, sure protection you need.

Modern, well-run industrial plants don't compromise with dust because they can't afford to. Compromising with dust means gambling with explosive dusts, exposing workmen to hazardous or toxic dusts, losing valuable materials, or ignoring higher operating costs and lower production directly resulting from uncontrolled dust.

DRACCO has the answers to industrial dust problems and has helped innumerable companies stop this threat to their efficiency and profits. DRACCO DUST CONTROL EQUIPMENT has found wide acceptance in industry because it incorporates proven designs, custom-engineering to specific requirements, and accurate fabrication—all based on DRACCO's 35 years of experience.



If uncontrolled dust is endangering your plant efficiency, why not call in DRACCO engineers for a specific recommendation on solving your problem?

DRACCO CORPORATION
4050 E. 116th St., Cleveland 5, Ohio
415 Lexington Avenue, New York 17, N. Y.

AGENTS IN PRINCIPAL CITIES

DRACCO *Performance Proved*
DUST CONTROL EQUIPMENT
PNEUMATIC CONVEYORS • METAL FABRICATION

Adventures of BILL

By PAT DWYER
Illustrations by RICHEY

SOME time ago," Bill said, "you were complaining that foundrymen were pretty well down on the totem pole as letter writers. This opinion was based on the frequency rate and not on the content. When the spirit moves one of these birds he can write a highly interesting epistle. Unfortunately, the spirit does not move him very often. Perhaps it would be more correct to say the spirit may be willing enough but is not strong enough to overcome the inertia of the flesh. You know the schoolboy version, 'The ghost is willing but the meat is weak.'"

"And what, may I ask, prompted this flow of oratory spiced with more or less doubtful quotations? Have you received a letter recently, or are you leading up to a plan or an excuse for not writing a letter that should have been written months, or perhaps many long years, ago?"

"Well," said Bill, "I'll tell you. At the Buffalo convention an old pal was telling me of a remarkable notice posted on the bulletin board of a plant where he had worked at one time. Without going into technical detail, he said he had acquired the document and would be pleased to mail it to me immediately after he arrived at the old home port and had cast anchor. Apparently he had some trouble with the anchor chains or the winches. (Note to printer: The word is spelled with an *i*)

"The document arrived only today with a brief note: 'Dear Bill; Here's the dope I told you about one day at the convention. Perhaps you might pass it along to Pat for his collection of rare—or should I say raw—foundry literature. Ha, ha!' Here take a look at it."

To: All Employees. Subject: Purchase Orders

There seems to be some confusion in the minds of our employes as to the methods this company uses in the purchase of various parts and pieces supposed to be attached to ships, inside and outside. The purpose of this memo is to clarify, if necessary, the simple procedure we have developed and perfected over a period of many years. To illustrate our methods, we want to and will use the simple hypothetical example.

Suppose our company has completed the outfitting of a ship. Size or classification is not a factor. Just as we are about to deliver it to the owners, a keen-eyed and loyal workman discovers that two nuts needed to hold the rudder together have been cracked. It now becomes necessary to replace these nuts with good ones. So, what does the workman do? At a reasonable time after lunch he notifies the Leaderman. The Leaderman notifies the Foreman. The Foreman summons the Departmental Clerk who prepares and issues a 5 x 7 in. Shop Order (S O) in quadruplicate. One white copy goes to the General Manager; one pink order to the shop; and one blue slip to the Outside Production Department. The fourth or green copy is thrown out through the nearest window, preferably on the South Side facing the harbor. Now we have a Shop Order. The work is moving fast.

After traveling here and there about the plant and offices for a day or two the shop order arrives at the Outside Production Department. To it, however, in the meantime have been attached various papers, including 16 blueprints, and an Authority Card, 6 x 8 in. The Authority Card is of no special importance and can be ignored in this discussion. Its principal or basic use is to have something on which to pin the shop order, blueprints and so on while it and they are in transit. These papers arrive promptly in the 8 a.m. mail at 9:30 in the morning. Promptly at 11:15 the same morning, 17 engineering order Nos. 426849-325-4-1 arrive. By adding the last five numbers together and dividing by 19.41 we know at a glance that these 17 engineering orders should be attached to the 16 blueprints on the nut order. What happened is that after the Shop Order was issued, someone discovered that the only tool available at the tool room for applying the square head nuts was a hexagon wrench. This situation was not provided for in the blueprint. To anticipate a recurrence of this or a similar regrettable error, the departmental clerk is demoted. One service stripe is removed from the right sleeve.

Ready For Bids

We are now ready to solicit bids. Requests in accordance with Government Regulations are sent out to at least three nut factories. Only one offer comes back, so we decide to order the nuts from the National Machine Products Co. anyway. The sales manager is a fraternity brother of our V.P.

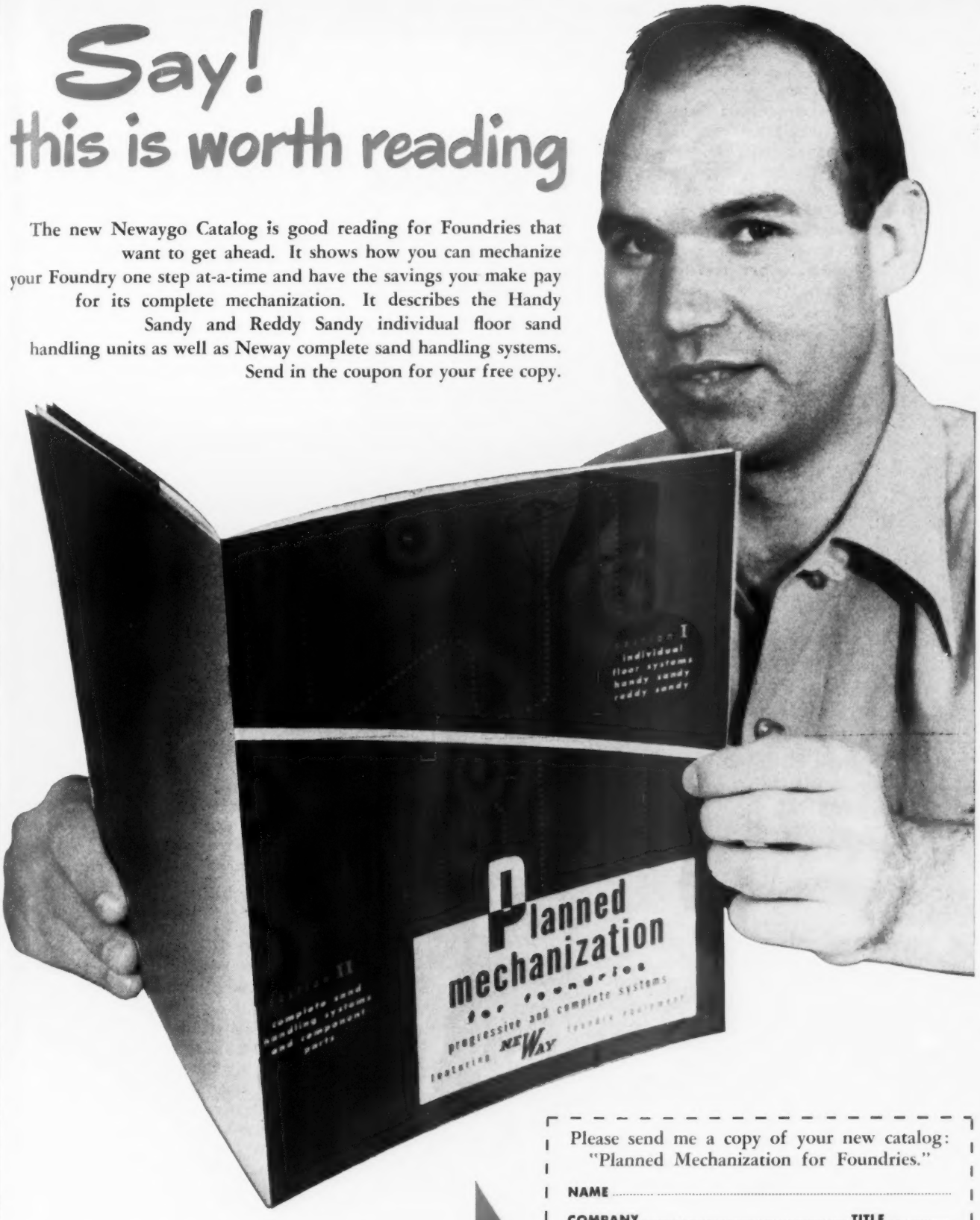
Next step is to issue the actual Purchase Order. This operation is

(*Continued on page* 210)

Thrilling scene from new industrial film "Teamwork Wins Again"

Say!
this is worth reading

The new Newaygo Catalog is good reading for Foundries that want to get ahead. It shows how you can mechanize your Foundry one step at-a-time and have the savings you make pay for its complete mechanization. It describes the Handy Sandy and Reddy Sandy individual floor sand handling units as well as Neway complete sand handling systems. Send in the coupon for your free copy.



mail this coupon today

There is no obligation

Please send me a copy of your new catalog: "Planned Mechanization for Foundries."

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COMPANY ..... TITLE .....

ADDRESS .....

CITY ..... STATE .....

Address This Coupon To:

The NEWAYGO ENGINEERING COMPANY
NEWAYGO, MICHIGAN

NEWAYGO | ENGINEERING COMPANY

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment.

(*Continued from page* 208)

started by a group of men and women in the Engineering Department. Working together at high speed and in perfect unison they produce a paper known as a Requisition. On the paper the writers place various marks, doodle signs and smudgy blind figures. This is done by passing the paper back and forth and round and round until every blank line is filled beyond the call of duty.

By special uniformed messenger on roller skates the Requisition is sent the Hectowriter who types a Master Copy of the actual Purchase Order. This is done by simply copying the date shown on the Requisition and then adding various phrases, quotations, paragraphs, priority ratings, terms, the little woman's age and bust measure, in fact most anything. A quotation from the Bible—for example, "They that go down to the sea in ships"—usually goes over and gets a big hand.

The Master Copy of the Purchase Order is then turned over to Sandra whose lips are red and whose eyes are blue, etc. She discovers 67 errors and sends it back for correction. Forty-nine errors are corrected, 18 are missed and 7 new errors are made in making corrections.

The Purchase Order now is ready for the Ditto machine. On this machine 382 copies of the order are produced. The first sheet through the machine usually is spoiled and therefore is known as the First Copy. This is sent to the Vendor along with a book of Rules, 13 handsome acknowledgments and a cordial engraved greeting card from our president. The other copies are distributed to the Army, the Navy, Marines, General Harry Vaughn, Senator Kefauver, the FBI, our superintendent, his secretary, her boy friend and to our various other departments. Any copies accidentally left over are donated to a paper drive for the Good Housekeeping General Welfare and Plant Hygienic and Recreation Fund.

Tricky Filing System

Sixteen copies are filed in various files scattered here and there in several offices. The purpose of this, of course, is fairly obvious. Suppose you or any other interested person wants to find a copy of an old order. Instead of making a nuisance of yourself going around asking for it, or trying to remember or determine which file it is in, you just run around in a more or less true circle. The first filing cabinet you fall over, you just pull open the top drawer—and there it is! It might not be the one you want, but there it is. You hardly could expect to sit there and have it delivered into your hand by a bright young messenger on a bicycle!

Forty-one copies of the Purchase Order go to a small group of men jokingly known as Expediters. These men are the furtive looking fellows who occasionally may be seen sneaking in and out of the office. With their tightly buttoned coats, tennis shoes and pulled down hats they appear and disappear like shadows or wisps of smoke.

The Head Expediter has a very interesting and responsible job. With a king-size map and a drawer full of colored pins he spends hours and hours at the game which by a curious coincidence is known as Expediting. By sticking a pin here and there apparently at random in the map, he knows exactly where every pin and every expediter is located, or where he is supposed to be at any given hour of the day or night. If his monthly expense report is accepted and verified by the Auditing Department, he wins. If he loses a pin or an expediter, he loses the game. Very

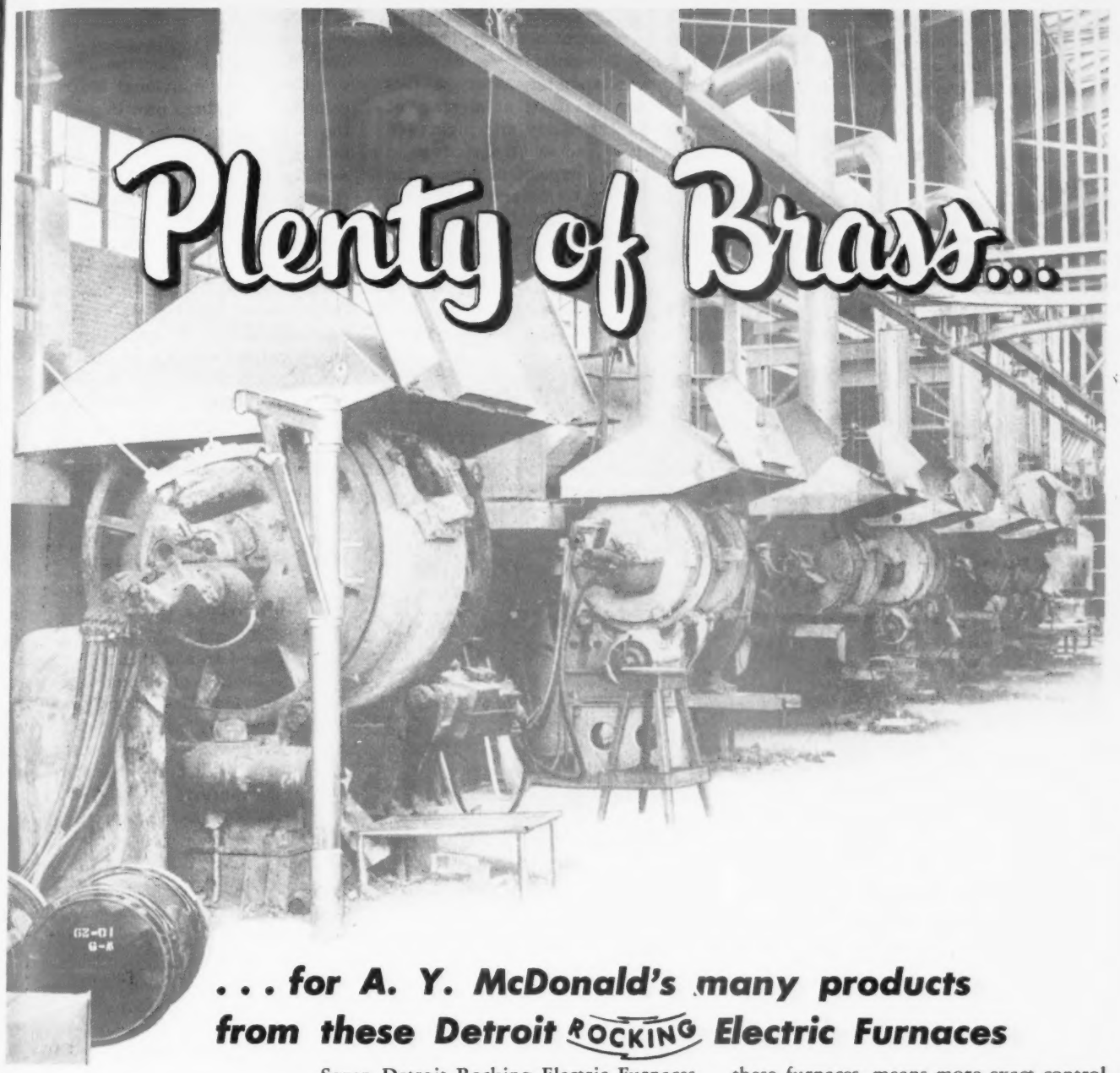
(*Continued on page* 212)

"No more gassed castings!"

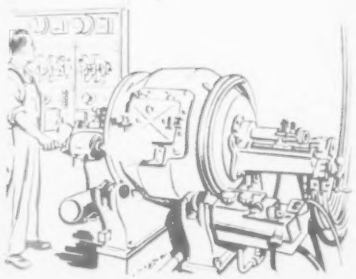
"Real temperature control has enabled us to eliminate gassed castings," writes an Illinois foundry. "Your Marshall Enclosed-Tip Thermocouples have helped us to eliminate both underheating and overheating of metals. This close check allows us to pour our castings as cold as possible, thus doing away with too much shrinkage."

Marshall Thermocouple measure temperatures of molten brass, bronze, aluminum and magnesium quickly and dependably. Their use aids in producing uniformly sound, dense castings best adapted for machining, increasing output, cutting production costs. Made in two types for use in furnace and ladle. Send for free descriptive folder. L. H. Marshall Co., 270 West Lane Ave., Columbus 2, Ohio.

MARSHALL
THERMOCOUPLES



. . . for A. Y. McDonald's many products from these Detroit ROCKING Electric Furnaces



Faster melts— better melts—
ROCKING ACTION DOES IT!

Seven Detroit Rocking Electric Furnaces in the foundry of A. Y. McDonald Company, Dubuque, melt the brass used in the products of this well-known manufacturer.

In this plant, as in hundreds of others throughout the country, Detroit Electric Furnaces deliver high-quality, uniform melts with great speed and efficiency day after day.

ROCKING ACTION

This exclusive feature makes for faster melts, more economical use of heat, minimizes the possibility of segregation. Close control of the rocking cycle, possible with these furnaces, means more exact control of melt characteristics, duplication of desired results through melt after melt.

RESULTING ECONOMIES

Better melts mean better castings, fewer rejects. More complete use of power means lower power costs. Better design results in less down time, lower maintenance costs.

Detroit Electric Furnaces are available in capacities from 10 to 4000 lbs. for ferrous or non-ferrous melting. Send your data. Let us show you the benefits you can have with Detroit Electric Furnaces!

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

Foreign Representatives: In BRAZIL—Equipamentos Industrias "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Casco, S. de R. L. Atenas 32, Despacho 14, Mexico City, D. F.

(*Continued from page* 210)

exciting. Any attempt to smuggle in a few spare pins or to ditch a little weight going around the turns, is frowned upon severely by the Board of Governors.

As soon as the expediters, noses sharpened to needle points, detect the first faint whiff of a new Purchase Order issued and placed, they fly into action. The unfortunate Vendor who accepts the order becomes the object of flattery, guile, persuasion, argument, threats, intimidation and general harassment in an attempt to get his signature on a sheet of paper known for want of a better name as a Delivery Schedule. God help the Vendor who signs a paper of this kind. From the time of signing, at every hour of the day and night and at every turn, he will be confronted by one or more expediters demanding in no uncertain terms and in Edward Robinson voice: "Hey, Fella, when are ya goin' ta come acrost with them there nuts?"

All Is Well—Or Is It?

Months go by. Tides rise and fall. Sun, moon, stars and major planets wheel through their accustomed space in the sky, but no nuts come over the horizon. In the meantime some overalled individual in the Machinery Outfitting, prowling through the scrap pile, finds two nuts that fit the rudder. Without consulting or seeking authorization of the Material Control Department, this calm and honest artizan, armed with a stillson wrench applies the nuts that fit the rudder and thus cleans up the job. The ship is delivered to the owners. The Captain and his Mates have the thankless task of gathering up a crew and attempting to teach them through a blistering and almost limitless salt water vocabulary how to sail the ship from one port to another without running her ashore or otherwise wrecking her. Fortunately this phase is outside the province of our organization.

So, what do we do? We cancel the order for the two nuts.

Now to issue a Cancellation Order. Oh Nuts! What's the use?

"Bill," I said. "I shall be very happy indeed to add this shining gem to my collection of things that never happened. I am afraid your old convention pal was taking advantage of the unwritten rule which protects all speakers and readers. Inflated with heady convention gas and bubbling over with the usual distorted sense of foundry humor, he took you for a flight."

Bill slowly lowered one eyelid over the other and remarked courteously that he was just a little boy from the country.

"However," he added, "I had a serious communication recently from a foreign foundryman who wanted to know the composition and kind of charge found by American practice to give the best results in a side-blow steel converter in which the metal is melted in the converting vessel by oil fuel.

"So far as I know there are no such converters used in America. Practically all metal for converter practice is melted in the cupola with coke fuel. The only exception is in some large steel plants where direct metal from the blast furnace is stored in a large mixer vessel and then transferred to the converter vessel in suitable batches as required.

"Usually the cupola charge contains from 30 to 50 per cent steel scrap and the remainder pig iron and return shop scrap. In extreme cases the entire cupola charge is steel scrap. The metal, as it comes from the cupola, contains 1.50 per cent silicon, 0.50 per cent manganese.

(*Concluded on page* 214)

Want core plates that SAVE MONEY?

. . . then use TRANSITE CORE PLATES for easy handling, low maintenance, long life!

You get real long term economy with Transite* Core Plates. Their initial cost is low . . . and their maintenance cost negligible. Transite Core Plates are tough and corrosion-resistant. They are made from an asbestos and cement composition by a special Johns-Manville process. They resist shock and corrosion . . . will not crack or break easily.

Here are other important reasons for using Transite Core Plates:

THEY SPEED PRODUCTION— Transite Core Plates are easily handled. They're simple to clean, too, since core wash, sand, etc. do not adhere to them as readily as to other core plate materials.

THEY MAINTAIN ACCURACY— Foundrymen who have used Transite Core Plates for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time.

For full details, write Johns-Manville, Box 290, New York 16, New York.

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

SEE WHAT *They* SAY
ABOUT
Giffels & Vallet

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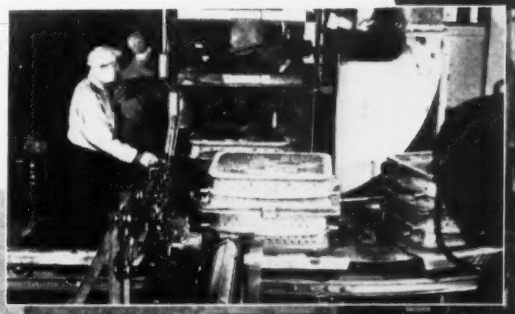
INDUSTRIAL ENGINEERING DIVISION
1000 Marquette Bldg. • Detroit 26, Michigan
COMPLETE FOUNDRY ENGINEERING SERVICE



HIGH SPEED
MOULDING SYSTEM
at J. I. CASE CO.
Bettendorf, Iowa

(*Concluded from page* 212)

Phosphorus and sulphur are kept as low as possible, but occasionally may go as high as 0.07 per cent. Total carbon will show approximately 3.2 per cent. Carbon and silicon are reduced to the desired analysis during the blowing process, but the sulphur and phosphorus remain unchanged. Therefore the material in the cupola charge must contain a minimum amount of these elements, especially when the casting specifications limit the casting content of these elements to 0.05 per cent maximum.

Studebaker Doubles Foundry Capacity

(*Continued from page* 107)

through a velocity trap in a main exhaust header. The velocity trap effectively throws iron and all heavy particles out of suspension by their kinetic energy in a single right angle change of direction and discharges them through a dribble valve to a tote box. The pressure drop through the velocity trap is little more than that of a right angle elbow, for which is serves in this instance.

When the cylinder block cooling conveyor emerges from the cooling shed it travels past a core knockout station where the block castings are removed from the cooling conveyor by a power hoist bridge crane and placed before a vibrating shakeout. An air cylinder pushes the casting onto guide rails on the shakeout to maintain the casting in the most effective position for removing the core sand as it travels through the shakeout. The casting is picked up from the far end of the shakeout by power hoist on a bridge crane and again suspended from the trolley chain cooling conveyor hooks.

Core sand, rods, wires, fin iron, etc. drop through the shakeout deck to a below floor hopper and onto a shaker conveyor. The pan of the shaker conveyor is perforated, permitting the sand to drop onto a trough belt by which it is conveyed over a magnetic pulley and discharged into a sluice. This sluice conveys the water effluent from four cleaning room collectors to a refuse dewatering tank in the material storage bay. The core knockout sand, amounting to about 250 tons per two-shift day, is screened and submitted to magnetic separation and then conveyed by sluice to the refuse tank.

All Carried By Water Sluice

All refuse is handled wet. The water effluent from nine multiple-stage, wet dust collectors and three operating water curtain cupola collectors, together with the slag from the three operating cupolas and all of the cylinder block core knockout sand, are conveyed by gravity water sluice to a double dewatering tank in the material storage bay. Other refuse, such as floor sweepings, brick and cleanup, is dumped into the dewatering tank from dump hoppers by lift truck or crane bail.

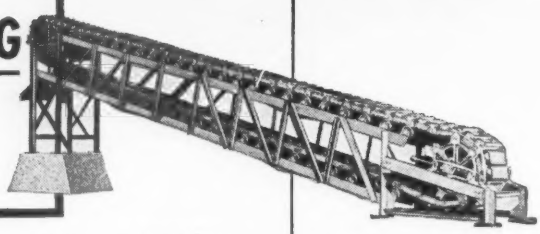
The dewatering tank, 42 feet wide by 75 feet long and 11 feet deep, divided longitudinally by a partition 7 feet high, is large enough to hold the refuse from a full day's production in either side. The two parts of the dewatering tank are used alternately. While one side is receiving water from the sluices, the water is pumped out of the other side into the operating side and the accumulated refuse is being drained and removed by bucket crane to car or truck for disposal.

The gravity sluices, carrying the refuse, discharge into one end of the operating side of the dewatering tank. The water flows at a low velocity to-

(*Concluded on page* 216)

Bailey

PIG CASTING MACHINE



For Ferrous and Non-Ferrous Smelters and Foundries

Ruggedly constructed for low-cost service, this machine is completely self-contained. If necessary it can be moved by crane and erected wherever needed. Once it is set in place, only an electrical connection is necessary for operation. The complete unit consists of the machine proper, motor, gear unit, variable speed reducer and drive.

CAPACITIES: 3 tons per hour to 50 tons per hour. 15 ft. to 100 ft. in multiples of 5 ft.

STATIONARY WHEEL

for Longer Service— Greater Economy

Bailey Stationary Wheel design eliminates 80% of the moving parts of the conventional type. The moulds are supported by endless chains that run on top of idler wheels which are mounted at stationary positions along the strand.

WILLIAM M. Bailey COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

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It's here!

New Permeable Metal Casting Plaster for Non-Ferrous Casting

Now, mold permeability is under your control—thanks to HYDROPERM, the latest in metal casting plasters. It's specially processed, completely formulated to assure the wide range of permeability so long in demand throughout the industry. Simply by adding different amounts of water and using a high speed mixer you can achieve the permeability you need.

Yes, this one material provides the permeability of sand, *plus*, the smooth accurate surface characteristics of conventional metal casting plasters. Besides, it handles easily and quickly, requires no special pattern equipment, and is unusually versatile.

Mail coupon now for new HYDROPERM technical bulletin, no obligation.

it's *HYDROPERM for**

1. PRODUCTION CASTINGS
2. MOLD CORES
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4. EXPERIMENTAL DIES
5. INSULATING PADS AND SLEEVES

Smoother Molds...Better Castings

RUSH COUPON TODAY!

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For Building • For Industry

Gypsum • Lime • Roof Decks • Insulation • Hardboards • Expanded Metal • Sound Conditioning

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Gentlemen: I want full information on new HYDROPERM Metal Casting Plaster. Please send Technical Bulletin, IGL-35, right away.

Name.....

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Firm Name.....

City.....State.....

(*Concluded from page* 214)

ward the other end of the tank, allowing time for the solids to settle to the bottom of the tank.

A skimmer plate, with its bottom edge immersed just below the lowest possible water level, extends across the tank near the end opposite that at which the sluices enter. This holds back floating material—bottles, cans, wood or coke—and prevents it from reaching the pump sump. Just beyond the skimmer plate a weir drains off the cleanest water into the recirculating pump sump. A set of louvers extending to the bottom of the tank holds back the sludge and solids when the tank is dewatered for refuse removal.

A pump room at the sump end of the dewatering tank is equipped with nine centrifugal pumps. Two are small pumps for transferring the water slowly from one tank to the other to minimize the sludge carryover in the dewatering operation. Six recirculating pumps, each with a capacity of 450 gpm, feed three main supply lines to the nine multiple-stage, wet dust collectors and three operating cupola dust collectors. One spare recirculating pump can be operated on any of the main supply lines. These pumps are specially designed for wear resistance and are equipped with renewable hard liners in sections for easy replacement.

While the core knockout sand is screened through to a refuse belt by the perforated pan of the shaker conveyor, the core rods, wires and tramp iron are conveyed and delivered to a secondary shaker conveyor. The pan of the secondary conveyor is solid where the rods and chunks are received but is opened in a louvered construction toward the advancing material for a distance in its length that is within the width of a tote box, and is then solid again to the end of the conveyor. As rods, wires, fin iron and parts of sprues advance over the louvered section of the pan, the rods and wires ride through while the shorter chunks of iron fall through the louvered openings into a tote box. The core rods and wires are discharged over the end of the conveyor into another tote box, thus making an almost perfect automatic separation of core rods and wires for reuse and iron scrap for remelt.

The cylinder blocks, after passing through the core knockout and being placed back on their trolley chain conveyor cooling line, proceed to the cleaning room where they are transferred from the cooling conveyor onto the spinner hook conveyor on which they are cleaned in a four-wheel centrifugal blast cabinet and placed on an apron chipping conveyor. There the fins are knocked off, jacket core wires removed, and the castings are touched up with high-speed hand grinders and passed through inspection.

At the end of this apron conveyor they are hung on a swivel hook trolley chain conveyor which passes through a blow-off cabinet and a water spray paint booth where the crankcase and tappet chamber surfaces are sprayed with casting sealer. They remain on the trolley chain conveyor for sufficient time for the sealer to dry and are then placed on the final finishing conveyor for spot facing locating lugs, water test and final inspection. The blocks are then loaded in carts for delivery to the machine shop.

While the demand for increased production was the impelling factor in this program of expansion and standardization of equipment, the management took advantage of this opportunity to further improve working conditions by providing equipment to do many heavy jobs mechanically and improving fume and dust control. In addition, the first-aid hospital was completely revamped with the most modern new equipment, including air conditioning. New tiled showers and locker rooms were installed with the result that the Studebaker foundry is a good place to work.

Equipment Suppliers

These companies supplied the major equipment in the Studebaker Corp.'s modernization program:

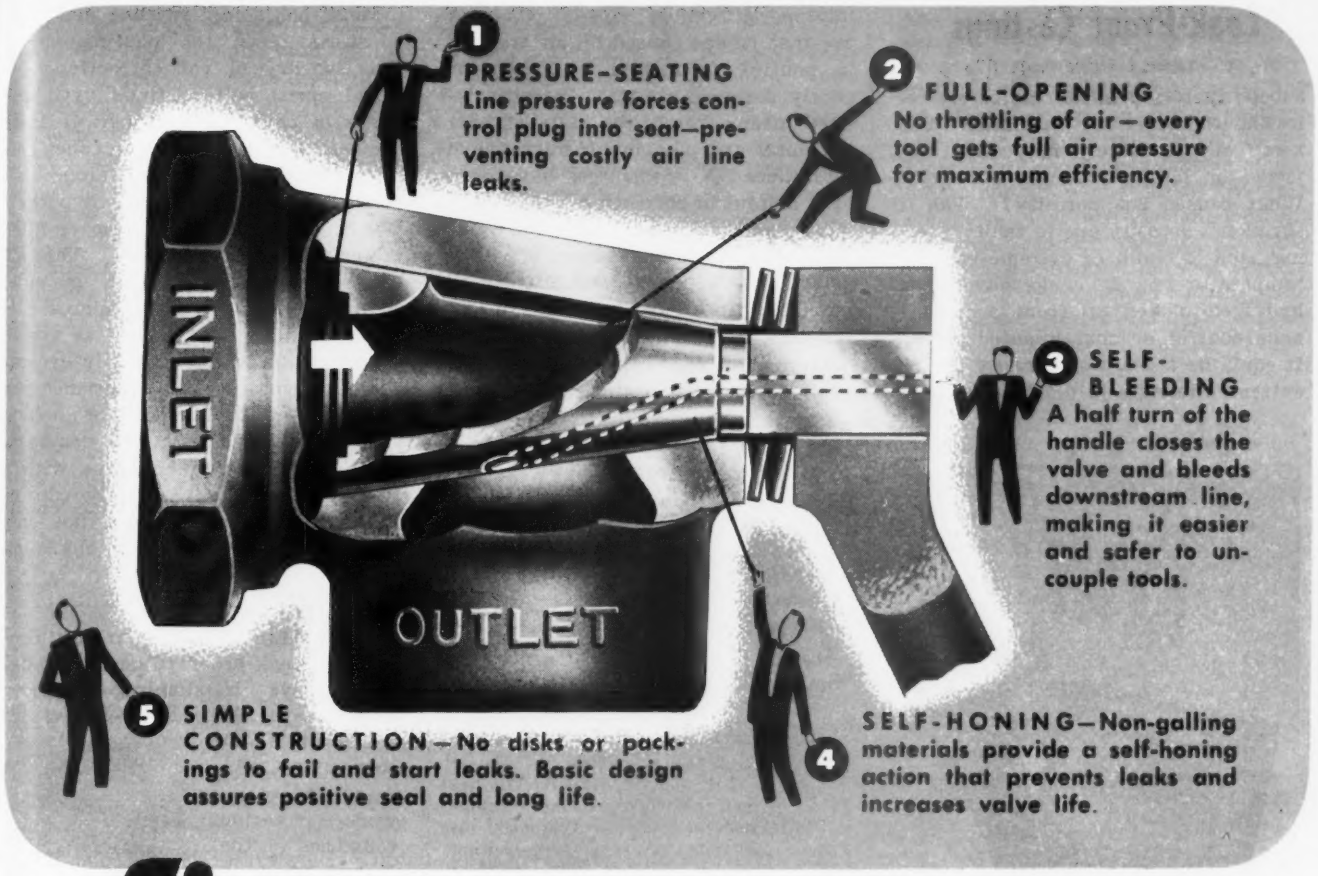
Ajax Flexible Coupling Co., Westfield, N. Y.
American Blower Co., Detroit
American Machine & Metals Inc., East Moline, Ill.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.
William M. Bailey Co., Pittsburgh
C. O. Bartlett & Snow Co., Cleveland
Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago
Champion Foundry & Machine Co., Chicago
City Pattern Foundry & Machine Co., Detroit
Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.
Cutler-Hammer Inc., Milwaukee
Wm. Demmler & Bros., Kewanee, Ill.
DeVilbiss Co., Toledo, O.
Economy Tool & Machine Co., Muskegon, Mich.
Electric Controller & Mfg. Co., Cleveland
Foundry Equipment Co., Cleveland
George J. Hagan Co., Pittsburgh
Hartzell Propeller Fan Co., Piqua, O.
Hatfield Electric Co., Inc., Indianapolis
Haughton Elevator Co., Toledo, O.
Hines Flask Co., Cleveland
International Molding Machine Co., LaGrange Park, Ill.
Keller Tool Co., Grand Haven, Mich.
Lima Electric Motor Co., Lima, O.
Manning, Maxwell & Moore Co., Muskegon, Mich.
J. S. McCormick Co., Pittsburgh
Mathews Conveyer Co., Ellwood City, Pa.
Milwaukee Foundry Equipment Division, SPO Inc., Milwaukee
Monarch Pattern & Engineering Co., Muskegon Heights, Mich.
National Engineering Co., Chicago
Palmer-Bee Co., Detroit
Pekay Machine & Engineering Co., Chicago
Powell Pressed Steel Co., Hubbard, O.
Pyle Pattern & Mfg. Co., Muskegon Heights, Mich.
Claude B. Schneible Co., Detroit
Shepard Niles Crane & Hoist Co., Montour Falls, N. Y.
O. J. Shoemaker Inc., South Bend, Ind.
Simplicity Engineering Co., Durand, Mich.
W. W. Sly Mfg. Co., Cleveland
Sollitt Construction Co., South Bend, Ind.
SPO Inc., Cleveland
Square D Co., Detroit
Standard Conveyor Co., North St. Paul, Minn.
Syntron Co., Homer City, Pa.
U. S. Electric Tool Co., Cincinnati
Jervis B. Webb Co., Detroit
West Michigan Steel Foundry Co., Muskegon, Mich.
Whiting Corp., Harvey, Ill.
Yale & Towne Mfg. Co., Philadelphia
Yeomans Bros. Co., Chicago

Saugus Pot Identified with Old Ironworks

PROOF of the claim that the Saugus Pot was one of the first iron products made by white men in America was obtained recently through spectroanalysis of the pot's metallic composition. The tests were conducted at the New England Spectrochemical Laboratories, Ipswich, Mass., through cooperation of the library committee, Lynn Public Library, Lynn, Mass., where the pot has been displayed for years.

Drillings from the pot were compared with specimens of ore, slag, broken castings and other artifacts found on the site of the three-century-old ironworks at Saugus, Mass. Presentation of the test results was made during the eighth annual meeting of First Iron Works Association, June 30. Restoration of the Saugus Ironworks, where the meeting was held, is in progress and is scheduled for completion in June, 1952.

W. W. A. Johnson, director of physics research, New England Spectrochemical Laboratories (left) and J. Sanger Attwill, president, First Iron Works Association, examine the Saugus Pot. Photo courtesy *First Iron Works Gazette*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No throttling of air—every tool gets full air pressure for maximum efficiency.
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Write for Bulletin
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Cleco Air Valves are made in all styles shown and in all sizes from ¼" to 1". Write for full information, including the name of your nearest dealer.

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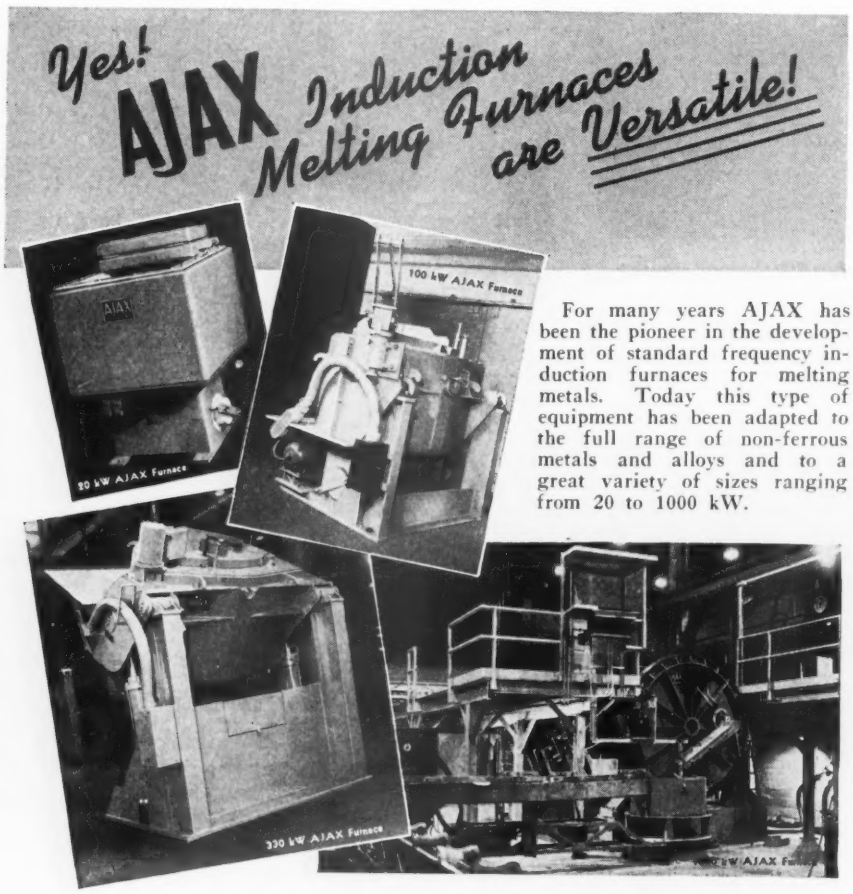
Leak-Proof Castings

(*Continued from page 97*)

subcontractors demand this before releasing the order for production. The x-ray report merely may say, "rejected or scrapped due to porosity." What caused the porosity? Was it shrinkage porosity due to faulty risering, lack of chills, or extreme pouring temperatures? It could have been hydrogen picked up from poor furnace control or contaminated metal. It could be a chain of porosity due to extreme moisture in molding sand, or improperly vented cores. Chances are that it was caused by air trapped in pouring or caused by faulty or poorly designed sprues. Porosity defined means simply the state of having pores and pinpoint or microscopic interstices. X-ray sources have been very helpful in correcting faulty castings, and it is wise to respect their judgment or interpretation of x-ray prints. Spending as much time as possible with an x-ray technician will give the foundrymen a better understanding of the various types and causes of porosity in the castings.

Metal has a fast swirling action as it starts down the pouring sprue. This swirling or vortical action in a round sprue will continue until the sprue is choked. Although it lasts for just a short period of time, this actually is the most dangerous moment. Between a series of hypothetical rings there remains a space filled or partly filled with air. The air which enters the casting or mold cavity will show up as microscopic bubbles, and will be defined as porosity. Instead of the generally accepted round sprue, actual experience has proved that the square or oblong sprue is superior. If one compares a 1-in. diameter round sprue with a 1-in. square sprue, it easily can be seen that the square sprue not only will retard the action but the additional area will feed the metal much faster and still choke completely. If one slab is poured through a 1-in. round sprue and another poured through an oblong ½ x 2 in. sprue an x-ray of both easily will show the difference of hydrogen or porosity content.

Use of chills never can be overstressed. Progressive solidification should be the constant aim. When a tom and, for example, has to rise 10 in. before metal enters risers, chills casting is gated at or near the bot- should be used on the drag or bottom of casting so that the metal ad-



For many years AJAX has been the pioneer in the development of standard frequency induction furnaces for melting metals. Today this type of equipment has been adapted to the full range of non-ferrous metals and alloys and to a great variety of sizes ranging from 20 to 1000 kW.

AJAX Induction Melting Furnaces are now used for the following applications: Die Castings, Permanent Mold Castings, Sand Castings, Billets for Rolling and Extrusion, Recovery of Scrap, Galvanizing and Aluminizing of Steel and many others.

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AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

E. M. Hunt, the author of "Producing Leak-proof Castings," has been active in aluminum foundry work since 1933. He received his education in southern California and worked in various foundries of that state. After operating his own aluminum foundry during the latter part of the war, he engaged in extensive consulting work, subsequently being in charge of General Tire & Rubber Co.'s Foundry Division on the Pacific coast, doing experimental work for the government. In 1949 he went to Los Alamos, N. M., as consulting technician on the atomic energy project. Going to Detroit in 1950, Mr. Hunt was plant manager for Aluminum Alloys Corp. prior to joining R. B. Carolin Foundry & Machine Co. as production and quality control engineer.

E. M. HUNT

jacent to the risers will be the last to solidify. Finger gates should be used wherever possible and should extend up the side from the bottom to the top of the casting.

The most successful type gate for many castings is shown in Fig. 2. The casting is made in a complete dry sand mold. It is a component part for a diesel pump and must withstand heavy oil pressure. The photos show the drag and cope side of casting. The metal is poured through a pouring cup which has an oblong opening, 1¼ x ¼-in. The sprue is 1¼ x ¼-in. at top. The bottom of the sprue where it connects with the finger gate sprue is 1¼ x ⅛-in. The finger gates are ½ x ⅛-in. As the metal rises in the mold cavity, hot metal is progressively entering. This type of gate delivers the last hot metal at the top of the casting, or in the risers. The coldest metal is in the drag and promotes progressive solidification.

This type of gating allows hot metal to enter the mold cavity at the metal level until it reaches the risers. Since hydrogen or air bubbles continue to rise or seek hot metal, there is a good chance to keep the metal in a liquid condition and allow air bubbles to escape out through the risers.

Moisture content of sand should be checked constantly with each batch delivered to the foundry system. Either natural or synthetic sand requires just so much moisture. A moisture teller or tester is a *must* in foundry equipment. Moisture in contact with high-temperature metal quickly expands. The reaction actually is small or miniature explosions. Unless the permeability of the sand will permit its escape, the metal, which has less resistance than the molding sand, will be saturated with air bubbles or porosity. Some form of mechanical device is needed to completely blend the moisture and break up any small clay balls.

Venting of cores is necessary not only to remove the steam, but also air which expands rapidly at high temperatures. The foundryman seeking to cast porosity-free castings realizes that porosity can be caused by many factors. By controlling all phases of molding, pouring, gating and risering he can make the type of casting so much in demand today. Daily records of heats, fluxing, degassing, etc. will be helpful in control. If trouble does arise, the records will enable him to find the cause. Through sharing ideas, through constant roundtable discussion and good progressive thinking, casting techniques continue to advance.

Book Review

Oxygen Cutting, by George V. Slottman and Edward H. Roper, cloth, 408, pages, 6 x 9 in., published by McGraw-Hill Book Co., Inc., New York 18. Price $6.50.

The metalworking industry will find this book of considerable value since it not only brings together the authoritative practical information from the widely scattered literature, but also includes sufficient theory to explain the action of the cutting jet, and the mechanism of the oxygen and flame cutting processes. The book contains 24 chapters dealing with various phases of oxygen cutting, including effects of oxygen purity; metal temperature and alloying elements on cutting action; effects of oxygen on ferrous alloys; plant facilities; oxygen cutting equipment; operation and use of the oxygen lance; hand and machine cutting; electronic tracing devices; multiple and stack cutting; underwater cutting, and economics of cutting. The book closes with a discussion of the future of oxygen cutting.

For fast removal of sprues and risers from Bronze . . . Aluminum and Iron Castings!

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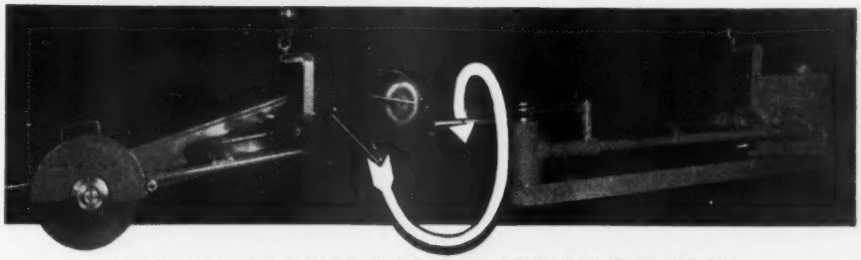

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The new Fox Swing Frame Cut-Off Machines have been designed to take advantage of the new type "flexible" cut-off wheels. The machine has full maneuverability through 180°. It is especially recommended for the removal of sprues and risers from bronze, aluminum and iron castings.

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FOX GRINDERS, Inc.

OLIVER BUILDING PITTSBURGH 22, PA.

New EQUIPMENT *and Supplies*

For Additional Information on these Items Use Reply Card—Page 223

(1)—Centrifugal Casting: Centrifugal Casting Machine Co., P. O. Box 947, Tulsa, Okla.—Heavy-duty centrifugal casting machine is designed for production of large-diameter, relatively short-length castings. Molds up to 25,000 lb and 40 in. in length can be accommodated for making castings up to 6 ft in diam. Machine features water-cooled shaft and bearings.

For More Details Circle No. 1—Page 223

1

(2)—Molding Machine: SPO Inc., 6449 Grand Division Ave., Cleveland 25—Jolt rock-over pattern draw machine features twin 5-in. jolt cylinders for both jolting and drawing operations. Machine has a 600-lb jolt capacity on standard 80 psi line pressure and a 10-in. pattern draw stroke. Having open ends, it can handle flasks of any length and up to 27 in. wide. Maximum flask space is 18 in. and minimum 13½-in. The machine employs two integrally mounted 1¼-in. air vibrators. The rock-over table is locked automatically in jolt and pattern draw positions by the rock-over air cylinder which prevents it from slapping or springing. Both flask and bottom board are held securely against the table during the rock-over by a quick acting, air-operated diaphragm type flask clamp. Replaceable wear strips are incorported on the jolt table. Machine has centralized controls, adjustable air locked leveling bars, single valve to control both flask clamp and leveling device, automatically controlled valve to govern the rock-over operation, and an adjustable two-speed draw.

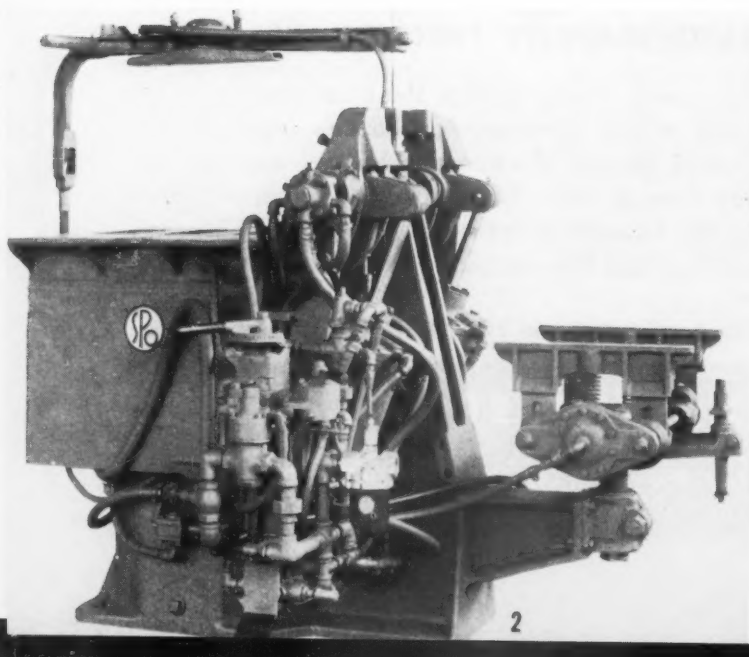
For More Details Circle No. 2—Page 223

(3)—Hoist: Coffing Hoist Co., 80 Walter St., Danville, Ill.—Spur gear hoist in ½ and 1-ton capacities weighs 39½-lb, including standard length of high-strength coil chain for an 8-ft lift. Hoist incorporates formed steel plate in the housing and a laminated back plate to give extra rigidity for supporting the hoist mechanism. Hoist may be disassembled for servicing in a few minutes with simple tools.

For More Details Circle No. 3—Page 223

(4)—Cabinets: General Electric Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 14—Standard storage cabinets for x-ray darkrooms are available in 5, 6, 7, and 8-ft models and provide a combination of work bench, storage compartment and shelf space. They are made of sanded hardwood with a coat of sealer or clear shellac. Loading bench area is covered with formica or equivalent. The 7 and 8-ft models incorporate a wastepaper bin. The three main sections of the cabinets—loading bench, service cabinet and center supporting section—are available separately.

For More Details Circle No. 4—Page 223



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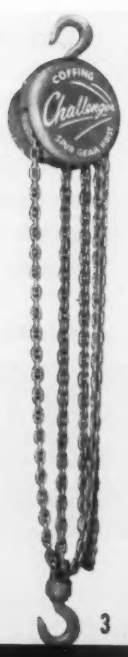


3

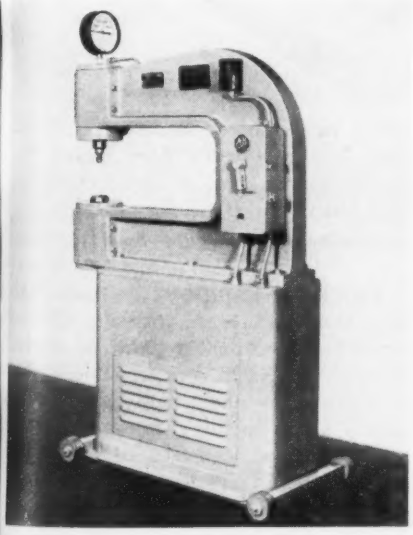
Electronic Scale: Streeter-Amet 4101 Ravenswood Ave., Chicago New scale uses electronic cells to record and print on ticket, tape or ledger sheets remote from the scale, the exact weight of any item within the scale's capacity. Load on the electronic scale is measured by BLH precision load cells. The signal from the load cells, which is proportional to the weight on the scale, is amplified and actuates an error sensitive servo mechanism. The indicating instrument is a full figure step cam controlled recorder. It includes provision for multiple ranges to give increased capacity with high sensitivity and accuracy.

For More Details Circle No. 5—Page 223

Motor Generator: Electric Machinery Mfg. Co., Minneapolis 13 —High-frequency motor generator sets are designed to convert 60 cycle current to 180 cycle and 360 cycle frequencies. They are useful in plants using high cycle automatic electric hand tools such as grinders and buffers. These sets are self-exciting and have built-in voltage regulation which automatically compensates for fluctuations in voltage to the load.

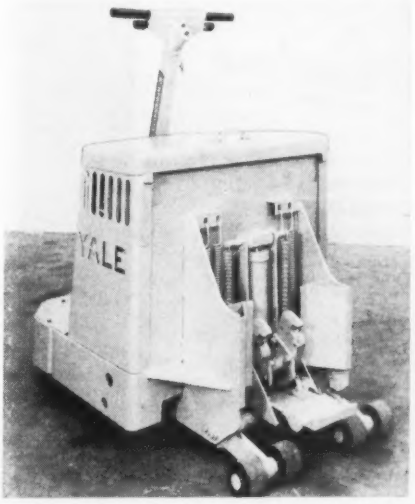
For More Details Circle No. 6—Page 223

Brinell Tester: Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4—Brinell hardness testing machine has a throat depth of 24 in. and was designed especially for testing armor plate. It is adaptable to testing other products requiring a deep-throated tester. The hydraulically operated unit is mounted on wheels so that it can be rolled out of the way when not in use and then rolled into position, reaching out over a conveyor. Lower anvil is the top of a hydraulic piston which rises as the load is applied to take the pressure off the conveyor. Machines are made to order so that anvil height will conform to customer's conveyor height. Maximum vertical opening between ball penetrator and anvil is 4 in. The tester applies a 3000-kg load.



For More Details Circle No. 7—Page 223

Motorized Tractor: Yale & Towne Mfg. Co., Philadelphia Division, 11000 Roosevelt Blvd., Philadelphia 15—Motorized tractor automatically engages various types of industrial trailers. When pulling a trailer the tractor will make a right-angle turn with the center of the turn being the fixed axle of the trailer, it is claimed. In operation, the tractor is driven to the end of the trailer and a push button is pressed, engaging a hook on the tractor with the lower side of the trailer frame. Next, a pair of secondary hooks reach out and grab the top part of the trailer frame, firmly engaging tractor and trailer. The trailing wheels of the tractor lift



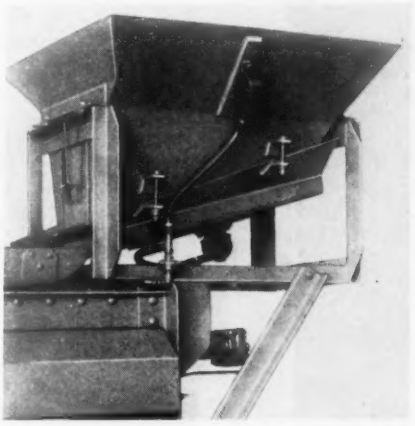
off the floor so that the weight of the rear end of the tractor is supported on the trailer and both form an integral unit. Tractor will operate successfully with almost any caster type trailer which has some projecting edge which the gripping mechanism can engage.

For More Details Circle No. 8—Page 223

Temperature Indicator: Tempil Corp., 132 West 22nd St., New York 11—Paste type temperature indicator has been developed for 2000° F. It is offered in 12 or 13-degree steps from 113 to 400° F, and in 50-degree steps from 400 to 2000°F. Crayon and pellet type temperature indicators are available in similar intervals covering the same range of temperatures. In addition, pellets can be supplied for temperatures above 2000° F in 50-degree steps to 2500° F.

For More Details Circle No. 9—Page 223

Sand Feeder: Wm. Demmler & Bros., Kewanee, Ill.—Vibratory sand feeder for chute or dump bucket loading is designed to provide a completely automatic flow of sand into a core blower. Because of its vibrating ac-



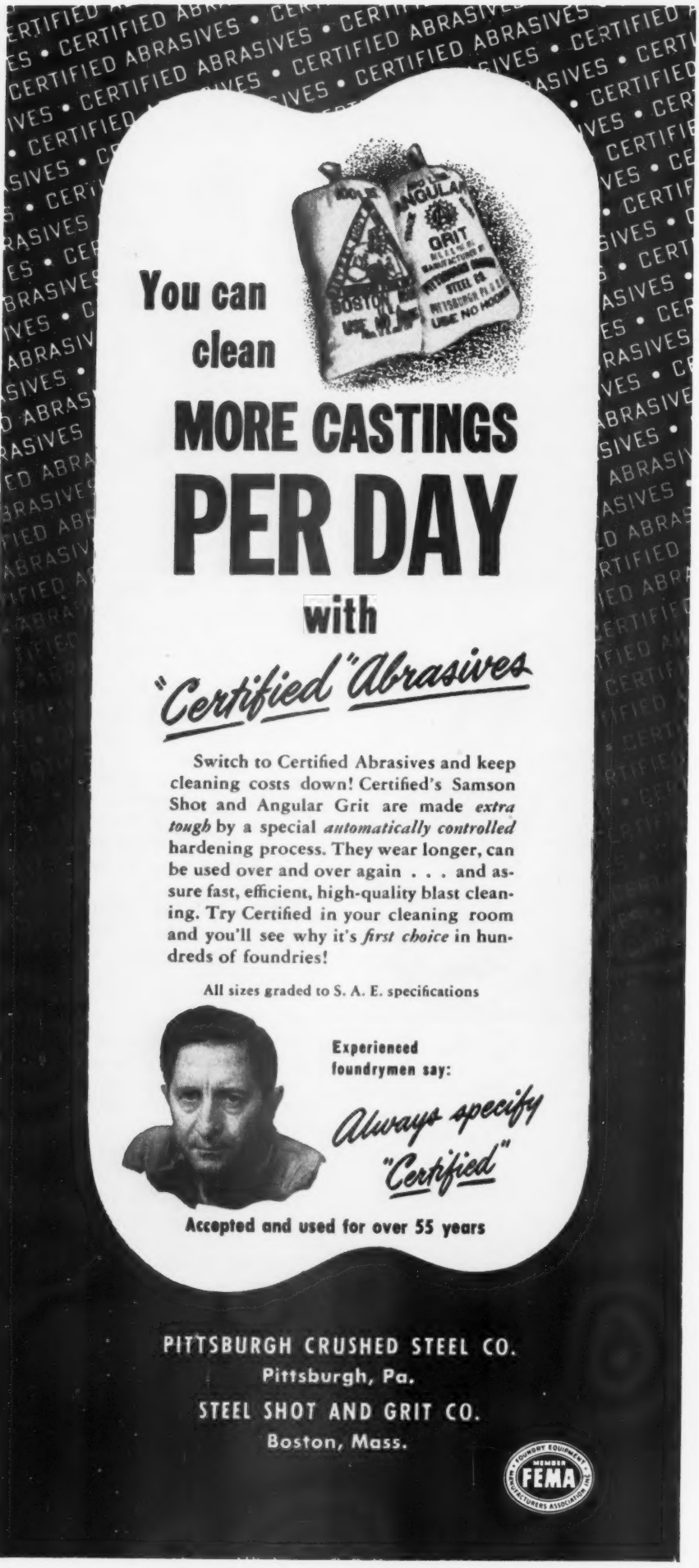
tion, sand is said to be delivered in an ideal condition for blowing even when the sand is so stiff it can be packed into "snow balls." Additional claims are that it requires no attention from the operator once it has been timed with the cycle of the core blower; it will not overfeed; when the hopper is full, sand delivery stops. Feeder is powered by two comparatively noiseless rotary type vibrators. It is available in 4 cu ft capacity for chute loading and in 6 cu ft capacity for dump bucket loading. To increase its capacity, sides of the storage hopper can be extended by the user.

For More Details Circle No. 10—Page 223

Floor Coating: Wilbur & Williams Co., Brighton 35, Mass.—Thick, tough, brushable rubber-base coating for application to metal, wood, or concrete is recommended for stair treads, ramps, garage aprons, platforms, and floor surfaces in general. Coating is said to reduce danger from slipping, even under wet conditions. It is supplied in tile red, light gray, and battleship gray.

For More Details Circle No. 11—Page 223

Gas Burning Nozzles: Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Combined flame retaining nozzle and long sweep elbow produces a long cylindrical, torch type blast flame with minimum combustion noise. It can be used for blast firing into open ports of furnaces with a negative draft, or for firing into the open without a combustion chamber, and where a small amount of excess air induced around the nozzle is allowable. Nozzles are said to retain the flame at their tips under usual operating conditions. Part of the air-gas mixture is taken from the supply and burns in a re-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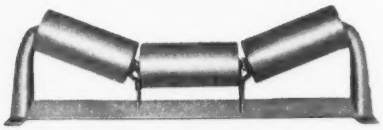
cess around the main burner opening, thus lighting the main flame. The nozzle design permits a wide range of mixture pressures without blowing the flame off the burner tip or backfiring. Available in sizes for 1½, 2, 3 and 4 in. pipe, the nozzles have capacities of 390,000 to 2 million Btu per hr with 6 psi mixture pressure.

For More Details Circle No. 12—Page 223

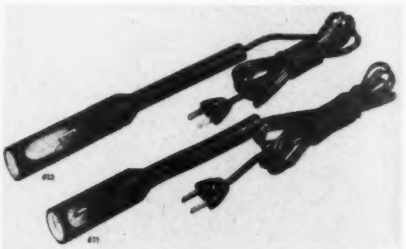
Idlers: Transall Inc., 109 North Eleventh St., Birmingham—Prelubricated belt conveyor idlers are said to require no future lubrication. A combination of contact sealed, high-speed,



heavy duty ball bearings and special mounting features work together to exclude foreign material and retain bearing lubricant. The sealed-in lubricant operates with no appreciable change in viscosity from —90 to 200° F, giving a practically constant idler friction factor throughout this temperature range, it is claimed. It melts at 376° F and is inhibited against oxidation, emulsification and saponification. Idler frame construction is all steel, jig welded for accurate frame alignment.

For More Details Circle No. 13—Page 223

Service Lights: Daniel Woodhead Co., 15 North Jefferson St., Chicago—Service lights 611 and 612, 7 and 15 w respectively, operate on 110 v and are designed for inspection and service of "hard-to-see" places in machinery, castings, and equipment.



Lamp has oilproof handle, 10 ft of cord, and removable fibre guard reflector which gives a two-directional light beam.

For More Details Circle No. 14—Page 223

Patching Compound: Hallemite Mfg. Co., 2446 West 25th St., Cleveland 13—Permanent repairs to chuck holes or breaks in concrete floors can be made easily and quickly with company's quick setting cement. Application method consists of cleaning out the hole or break, mixing the

(*Continued on page* 226)

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

50. Foundrymen's Friends

Cincinnati Tool Co.—The friend, and vital necessity, of all foundrymen is the stock of tools he uses. Hargrave clamps, chisels, punches, star drills, washer cutters and other tools such as clamps, hammer chucks, wrenches and file cleaners are included in 40-page illustrated catalog 49.

51. Motors, Motors, Motors

Miehle Printing Press & Mfg. Co., Star-Kimble Motor Div.—Three bulletins, No. B-201, B301 and B302, give the facts on Star-Kimble polyphase squirrel cage motors in various types, wound rotor induction motors in various types and single phase repulsion motors of alternating current type. All are engineered for specific uses in your plant.

52. Many Kinds of Conveyors

Standard Conveyor Co. — What is your conveyor problem? Whether it be the handling of flat sheet or coils of steel, brass products, pneumatic conveying or, more important to you foundry people, carrying of molds and flasks, this 12-page well illustrated catalog No. 67 can help you. Send for it.

53. Science of Grinding

Cleveland Quarries Co., Sterling Grinding Wheel Div. — Small, but sweet is the pocket-size 42-page booklet "The Art and Science of Grinding" which contains a wealth of information. It presents descriptions of Sterling wheels and much data in table form. Don't miss this one.

54. Foundry Equipment

Sterling Wheelbarrow Co.—Practically all the equipment you might need in your foundry is listed in this catalog No. 60A. In its 56 pages you will find listed flasks, bushings, core plates, wheelbarrows, core trucks, casters and lots of other stuff you need and use every day.

55. Foundry Machines

Tabor Mfg. Co.—Included in 12-page illustrated bulletin No. 514 are descriptions and specifications for complete line of jar, rollover and pattern draw machines of hinged and trunnion types. Machines produce molds and cores from small ones up to those coming from 3000-lb flasks. And most machines can be made completely shockless. Get the facts here.

56. Reclaim Those Porous Parts

Tincher Products Co.—Another way to make some of the red show up black on your books is to recover rejects due to porosity in castings and parts by Tincher process. Questions are answered on process in illustrated brochure. Processed parts will withstand liquid or gas pressure.

57. Magnet Chain

S. G. Taylor Chain Co.—Friction, twisting and gouging, causes of excessive wear on magnet chain, are eliminated by new chain described in illustrated data and dimensional sheet. Bulletin 85 describes TM Downtown type chain which is resistant to shock and subzero temperatures.

58. Foundry Burners, Torches

Hauck Mfg. Co.—Just for the asking, you can get 12-page catalog No. 1043 B and attached price list covering line of oil and gas burning equipment for foundries. Burners for cupola lighting, mold drying, ladle heating, core baking and furnace heating are illustrated and described. Send for your copy.

59. Casting Resin

Rezolin, Inc.—First of two valuable data sheets outlines advantages of No. 8000 Tool-Plastic nonshrink casting resin which include time savings and use of less skilled manpower. Other outlines formulation and mixing instructions for liquid type quick-set accelerator for use with 8000 Tool-Plastic resin.

60. Molder's Tools

Monk Tool Co.—8-page illustrated catalog makes it easy to select the correct molding tool for the job. Each is listed according to type and sizes available. Some of tools included are trowels, various double end tools, short heel tools, special lifters, flange and hub tools, slicks and miscellaneous accessories. It is catalog No. 50.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

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61. Magnetic Separator

Homer Mfg. Co.—6-page illustrated folder 101A-1 describes uses of permanent magnets for removal of tramp iron and steel in processing of various materials. Form PY104-1 contains chart of material factors for determining pulley size. Both will help you eliminate a prime bug-a-boo of foundrymen.

62. Dust Suppressor

Whiting Corp.—An article describing dust suppressor installation at General Metals Corp., Los Angeles, and folder FY-169 giving details of equipment is dual offer being made by this company. Both will help you. Get them!

63. Graphite in The Foundry

Acheson Colloids Corp.—How to use 'dag' colloidal graphite in the foundry is subject of 6-page folder No. 425. Dispersions are available for chills, permanent mold coating, application to cavities, in gates and risers, lubrication of shoulder screws and base plates, for pattern coating and many other applications. If you make castings, you need this bulletin.

64. It's In The Bag

G. H. Tennant Co.—Dirt, dust and debris that settles on your company floors will end up in the bag when Tennant industrial power floor sweepers are used. Models 36, 24 and R, which will do anything from shearing away packed layers of dirt and oil to fine dust pickup, are described in three available data sheets with full illustrations and specifications.

65. Truck Loader Attachment

Hykap Inc. — Truck loading a problem? If so, you should look into Hykap versatile loader attachment for dump trucks which can load up to 1 ton of bulk materials per minute. Driven from top of cab while loading, loader attachment will also handle drums, bales, crates, etc. A 4-page illustrated bulletin has all the dope. Send for it!

66. And Even Paint Over Rust

Thompson-Long Co. — That old nemesis rust can be destroyed and its future formation retarded by R-10 - X liquid chemical preparation which provides an ideal base for paint. Containing selenium and chromium, nonflammable liquid is applied by brush, spray or dip. Sound good?

67. Tells The Temperature

Claud S. Gordon Co., — 4 - page form No. XT-3-51 presents essential information on several pyrometer types for high and low temperature indications. Included are five pyrometers, six types of thermocouples and extension arms.

68. Protect Your Welders!

Willson Products, Inc., — Wide range of eye protective devices for both gas and arc welding is contained in this highly informative 4-page circular. Respiratory protection for welders, rubber mask padding for goggles, Weld-Aid lens for bifocal-wearing welders and selector chart of types and shades of filter glass for different welding operations are included.

69. Machinery Grouting

Master Builders Co.—There's a lot to learn about the "Embeco Non-Shrink Method of Grouting" in this 16-page illustrated booklet of the same title. It covers common methods of grouting; mixing and placing of grout; selection of sand, cement and aggregates; and recommended mixes and estimating tables. Plenty of schematic drawings make interesting reading.

70. Conveyors & Car Unloaders

George Haiss Mfg. Co. — First of two illustrated bulletins, No. H-481, presents salient features of model 481 flat belt conveyors for bulk materials. Two models have 70 and 100 tons per hour capacity. Bulletin H-501 covers model 501 combination chain and belt hopper bottom car unloader for bulk materials, capacity is up to 5 tons per minute. Both are work savers!

71. Sand Blast—Core Knockout

Pangborn Corp. — Well-illustrated bulletin No. 1110 describes how Hydro-Sand Blast is applied to solve core knockout and casting cleaning problems economically, details application of special machine for cleaning heat exchanger tubes and gives specs and drawings of two standard machines. Get it! It's a knockout.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

72. Copper Sand Castings

A must for your reference file is 10-page illustrated FOUNDRY reprint entitled "Beryllium Copper Sand Castings." Article describes foundry practice, engineering properties, structure and uses of four commercial beryllium copper and sand casting alloys. Typical physical and engineering properties are tabulated.

73. Riser Insulation

How riser insulation is applied to result in sounder bronze castings and increased metal yield is detailed in this 7-page illustrated reprint "Insulation Increases Riser Efficiency." Although almost 2 years old this article offers much info of value to nonferrous foundrymen. You'll want a copy!

74. Centrifugal Casting

"Some Recent Developments in Centrifugal Casting" is illustrated reprint of article which appeared in two parts. Authors M. L. Samuels and Dr. A. E. Schuh describe particularly a method employing metal molds and applications of dual-metal castings in which dissimilar metals are cast successively within centrifugal mold. Get these two well-written articles.

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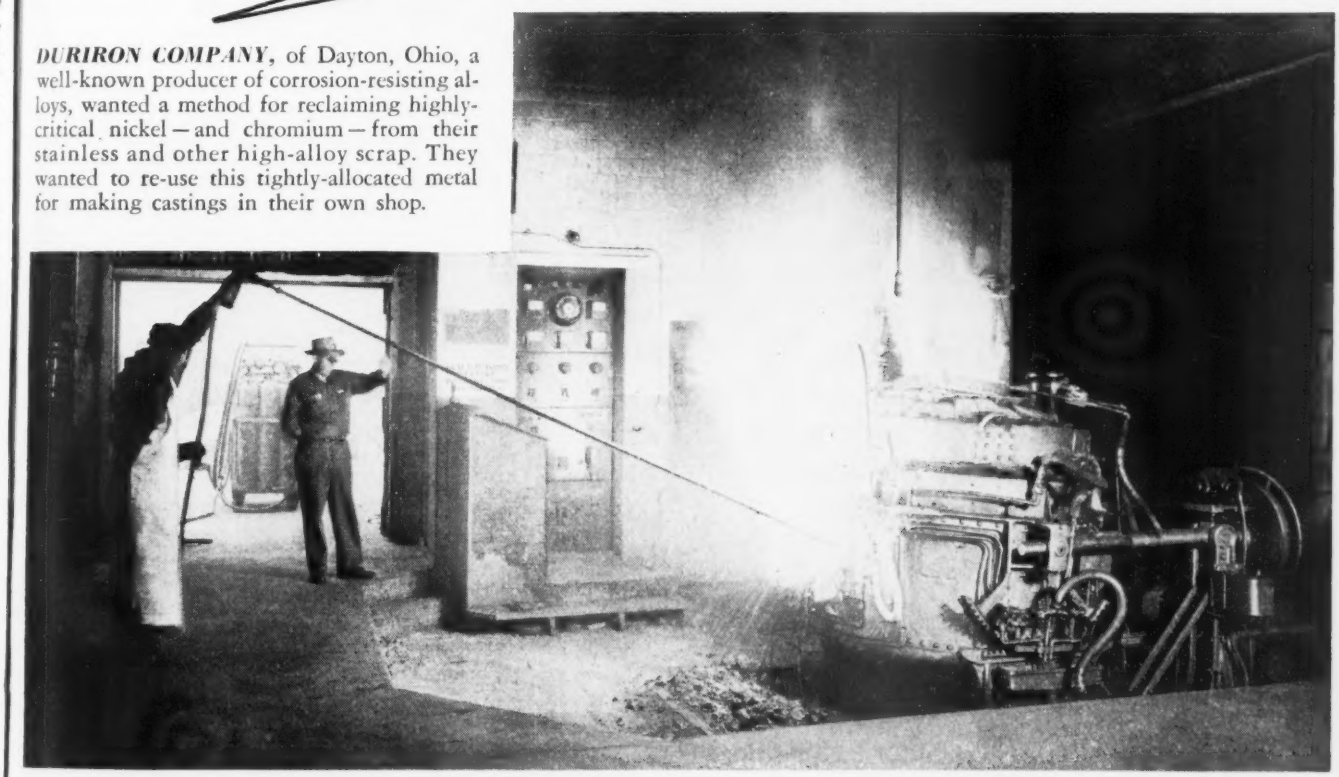
NEW Airco Oxygen Process reclaims nickel...chromium from stainless and high-alloy scrap

DURIRON COMPANY, of Dayton, Ohio, a well-known producer of corrosion-resisting alloys, wanted a method for reclaiming highly-critical nickel — and chromium — from their stainless and other high-alloy scrap. They wanted to re-use this tightly-allocated metal for making castings in their own shop.



W. T. Bryan, Duriron Co., and ***H. C. Linde,*** Airco Technical Sales Representative, working together, used oxygen refining as a means of removing carbon from the alloy steel bath. On the basis of experience, it was found that the carbon removal was accomplished without excessive oxidation of chromium from the high alloy scrap charge. Equally important, all of the nickel charged was recovered. This permitted the foundry to reclaim all scrap.

The Duriron Company was highly pleased with these results, and have adapted this process as standard practice ... and, now produce low-carbon, high-alloy castings from material that otherwise would be useless to them.

For further information about this modern method for reclaiming high-priority nickel — and chromium — from your scrap, call or write your nearby Airco office for Technical Sales assistance.

AIRCO

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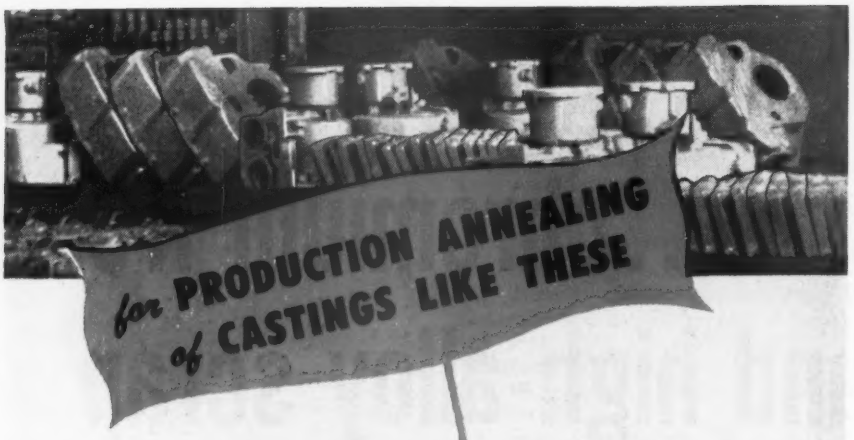


for PRODUCTION ANNEALING of CASTINGS LIKE THESE

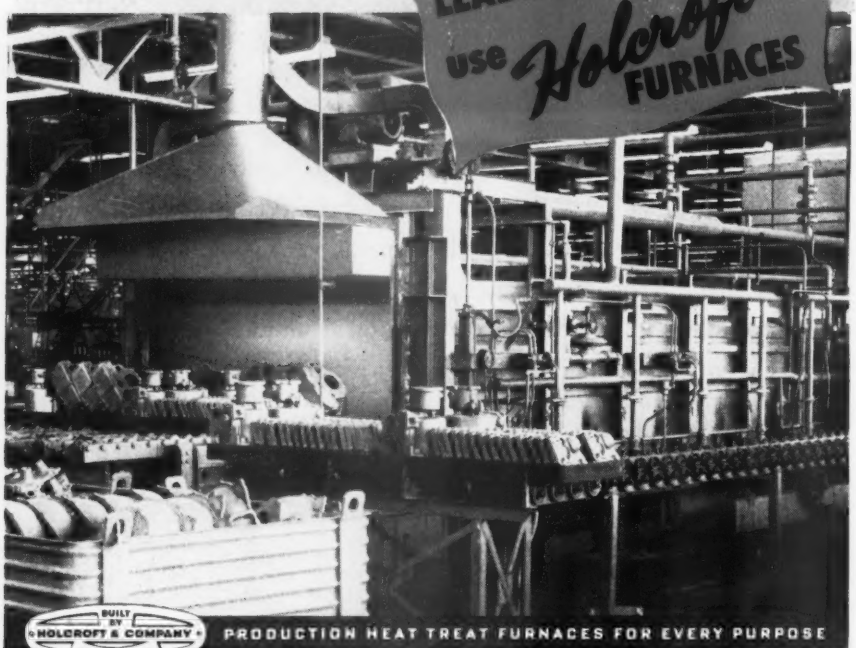
This compact Holcroft furnace anneals, descales and desands castings at a production rate of 10,000 lbs. per hour.

Not only that, but it delivers the castings at a lower cost per piece.

Foundries all over the country depend upon Holcroft to give them the furnace help they need. That's because Holcroft is such a well-known leader in the field. Many foundry practices, standard procedure today, were basic ideas worked out by Holcroft engineers.

You, too, can take advantage of this furnace know-how. Write today for complete information. **Holcroft and Company, 6545 Epworth Blvd., Detroit 10, Michigan.**

LEADING FOUNDRIES use Holcroft FURNACES



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PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

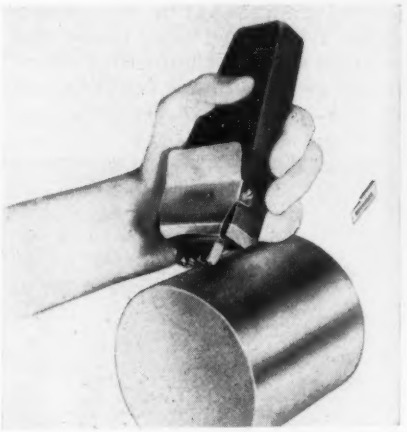
CHICAGO 9 — C. H. Martin, A. A. Engelhardt, 4209 South Western Blvd.
CLEVELAND 15 — Wallace F. Schott, 1900 Euclid Ave.
HOUSTON 1 — R. E. McArdle, 5724 Navigation Blvd.
CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

(*Continued from page* 222)

cement compound with water and pouring it into the opening. Material is said to be self-bonding, will not shrink, and requires no trowelling. Patch is said to be ready for light loads in 15 minutes, normal trucking in 30 minutes, and heaviest loads within 1 hour.

For More Details Circle No. 15—Page 223

Numbering Tool: Acromark Co., 327 Morrell St., Elizabeth 4, N. J.—Numbering tool, which uses ordinary straight line flat surface marking type can be used for marking convexed surfaces by inserting a segment between each piece of type. A formed metal plate with a flange held taut by a coil spring, locks each piece of type and each segment spacer in place but allows removal and inter-



changing by thumb pressure on the formed spring pressure clip. Illustration shows the holder in a hand style. It also is provided in press styles, having a shank for standard ram sizes. Standard sizes are 4, 6, 8 and 10 type piece capacities, sizes ranging from 1/16-in. to ¼-in. Other sizes can be provided on order.

For More Details Circle No. 16—Page 223

Ventilating Fans: Harvey P. Bertram Co., 1009 West Ninth St., Cincinnati 23—Propeller pitch of industrial air fans is adjustable to increase or decrease air capacity within the limitations of the motor horsepower. Propeller parts — hubs or blades—are individually replaceable, reducing repair costs if damage to the unit occurs. Cast aluminum fan blades are balanced by precision machines. Each airfoil station of each fan blade is checked for proper pitch and track. A complete range of sizes is offered, from 14 to 72 in., engineered to move 100 to 100,000 cfm. Motor horsepowers range from 1/20 to 25. Direct connected models use open or totally enclosed motors

(*Continued on page* 229)

A ZIG-ZAG Conveyor in the core department of a large foundry. Baked cores are transferred direct from ovens to conveyor carriers. While cooling, cores move via upper elevation to checking and ganging benches. This installation, over 500 feet overall and constructed entirely of stock sections, is powered by two synchronized drive units.

with R-W "Zig-Zag"® Continuous Power Conveyor

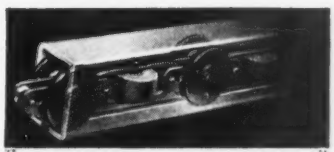
Anything as fragile as a core requires a lot of careful handling. A sudden bump or jerk can mean extensive breakage and the loss of costly production time. But with a ZIG-ZAG Continuous Power Conveyor, handling is reduced to a minimum and the danger of breakage all but eliminated because ZIG-ZAG moves along smoothly and jerk-free at any speed from 1 in. to 60 ft. per minute.

And another important fact to consider—ZIG-ZAG helps to solve labor and production problems, too . . . it relieves women workers of heavy lifting while releasing men for other important tasks . . . it smooths out production bottlenecks resulting from cramped, overloaded floor space.

ZIG-ZAG operates just like "water through a pipe"—it's a steel tube-like track through which travels a specially constructed motor-driven chain carrying unit loads up to 125 pounds each. And it's highly flexible too—if changes or relocation are required you can take it down here and put it up there, and in most cases *use all of the parts!*

* * *

Learn how patented ZIG-ZAG can save money in your core department. Send for details—or better yet, have an R-W engineer consult with you at no obligation.



Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

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"A HANGER FOR ANY DOOR THAT SLIDES"

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SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
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Ajax-Northrup furnaces are famous for their ability to give back what you put into them. They melt *any* metal with minimum losses, at high speeds, and with extremely accurate control of analysis and pouring temperatures.

For example, a foundry using these furnaces to melt stainless steel for corrosion and heat resistant castings reports the following figures on recovery of elements going into the make-up of 18-8 type alloys:

Ni: 100% Cr: 99% Mn: 90%
Si: 94% Mo: 95% Cb: 92%

Another Ajax user saves $60,000 a year just by reducing chromium losses alone. Still another controls pouring temperatures within 20 deg. F., turns out castings so perfect that repair welding has been eliminated.

Ajax-Northrup can save metals and money for you, too. Write us today for details.

SEND FOR NEW INDUCTION HEATING AND MELTING BULLETIN

134

FOR HEATING AND MELTING

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AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

AJAX ELECTROTHERMIC CORPORATION

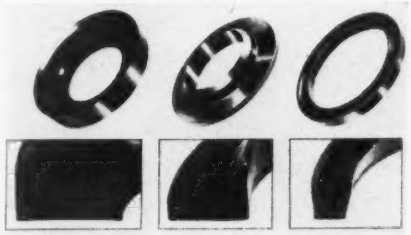
AJAX PARK
TRENTON 5, NEW JERSEY

(*Continued from page* 226)

with continuous duty ball bearings. Belt driven fans are supplied with open type, self-ventilated motor.

For More Details Circle No. 17—Page 223

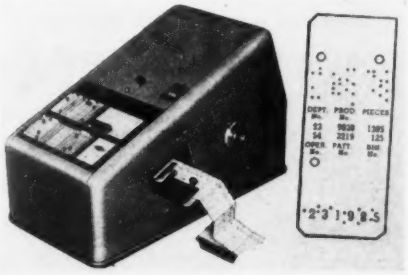
Packings: Periflex Inc., Hazel Park, Mich.—Molded packings for hydraulic and pneumatic equipment are compression molded from a special fabric and neoprene compound said to have unusual wear



qualities and resistance to a wide variety of hydraulic fluids. Designs available include cup, flange, "U" ring and "O" ring, for use in cylinders, pumps, valves, etc., as static seals or in traverse action applications.

For More Details Circle No. 18—Page 223

Control: A. Kimball Co., 307 West Broadway, New York 13 — Electronic equipment is designed for control of production, payroll, inventory, and other items. Use of the control system involves issuance of punched tickets with fixed information such as production order number, operation number, style or type number, or bin number. These tickets are used to flow with the job or material. When the operation has been completed, ticket is forwarded to punch card department where an



electronic scanner produces standard punched cards from which data can be obtained for reports and checks on operations.

For More Details Circle No. 19—Page 223

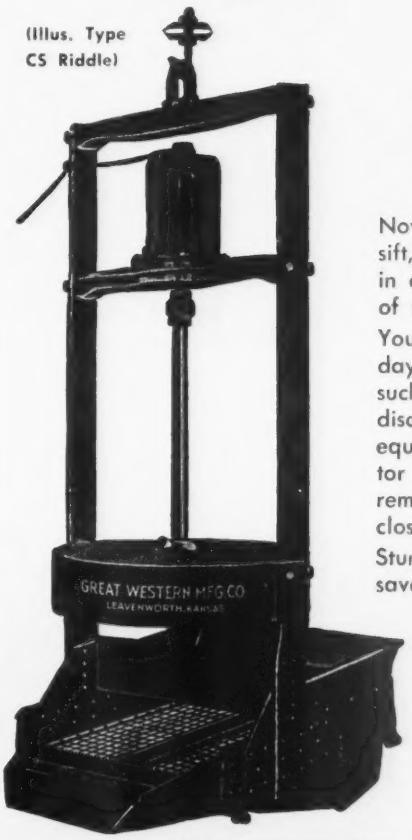
Plastic Lenses: Willson Products Inc., Second & Washington Sts., Reading, Pa.—New, 6-curve, plano plastic lens for industrial safety goggles is said to have good resistance to scratches, abrasions and common industrial acids. Additional qualities claimed are light weight, good impact

The KEY to LOW COST FOUNDRY SCREENING

with COMBS Gyratory FOUNDRY RIDDLES

- Screen
- Sift
- Mix
- Fluff
- Aerate

(Illus. Type CS Riddle)



Now you can do a better screening job—sift, mix, fluff and aerate in one operation, in a fraction of the time and for a fraction of the cost of hand screening.

You can do from 10 to 20 men's work in a day with a low-cost Combs Gyratory Riddle—such as Type CS at left, which automatically discharges refuse, gaggers, etc. Completely equipped with a fractional horsepower motor (costs less than 1c an hour to run) quickly removable 24" screens and completely enclosed bearings.

Sturdy, compact—saves sand, saves time, saves manpower. Only $320 f.o.b.

Type CR—24" round screen, without automatic discharge (screen removed, cleaned, replaced in 5 seconds) $310.

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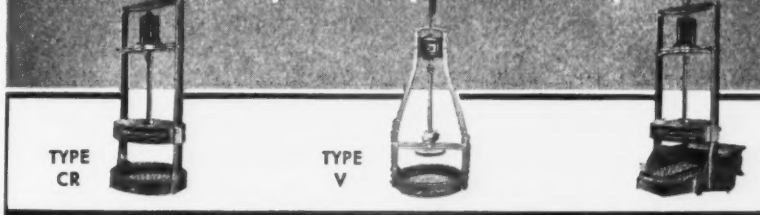
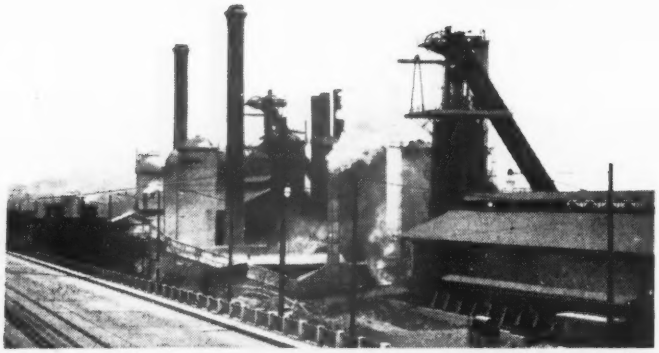


TYPE CR — TYPE V — TYPE CS

GREAT WESTERN MANUFACTURING CO.
LEAVENWORTH, KANSAS, U.S.A.



More Coke..More Coal Chemicals and soon More Pig Iron

for Southeastern Industries Served from Birmingham by

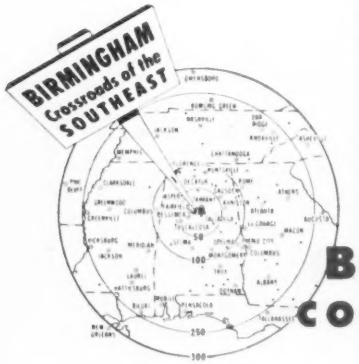
SLOSS-SHEFFIELD STEEL & IRON COMPANY

Big expansion programs involving expenditure of many millions are the order of the day with the Birmingham district's major industries that serve the Southeast. Mainspring of these large-scale developments is the burgeoning prosperity and accelerating progress of the surrounding Southeastern market area.

In the words of Claude S. Lawson, president of Sloss-Sheffield Steel & Iron Company, which recently announced extensive plant additions and improvements:

"The Southeast's economic progress this past decade has been dynamic. Industries that serve the Southeast from the centrally situated Birmingham district have been levered by this progress into large expansion programs. Take our own Company, for instance. So rapidly has the demand for iron increased in the Southeastern trade area that we are making the largest investment in new facilities in our Company's recent history. We are building a new battery of coke ovens to serve our own furnaces and the booming foundry trade . . . opening new coal and ore mines . . . enlarging and diversifying our production of coal chemicals and further modernizing our plants and equipment. This will result in more coal and coke, more coal chemicals and by-product gas and merchant iron. We are keeping pace with the Southeast's progress and readying our industry to serve its future needs."

* * * * * * * *



Many types of industry in the strategically located Birmingham district are growing with the Southeast. Many are moving in. The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

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State of Alabama

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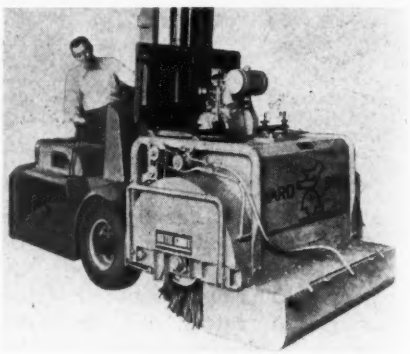
resistance and visible light transmission. Lens is available in drop-ova (P3) shape, in 44 and 47 mm size as well as 50 mm, round. Also o fered is a plastic cover lens for welc ing helmets and goggles. It comes i 2 x 4½-in. and 50 mm round sizes 0.040-in. thick.

For More Details circle No. 20—Page 223

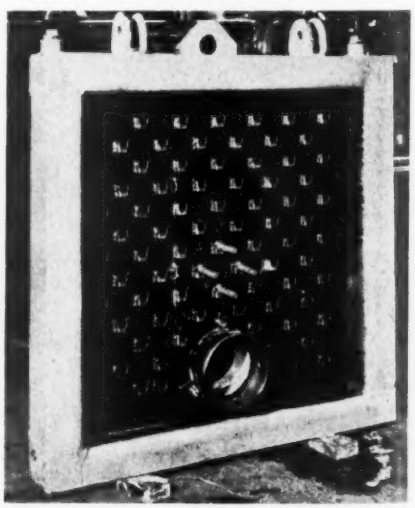
Sweeper: Little Giant Product Inc., 1530 North Adams St., Peoria Ill.—Powered sweeper attachment i designed to fit any fork lift truck o



1500 lb or greater capacity. Intended for indoor or outdoor operation the sweeper is said to be capable of cleaning 80,000 sq ft of surface per hour. Sweeper is powered by a 6.8-hp gasoline engine and has its own self-contained 30-gal water spray system for dust control. By attachment to the forks of the lift truck at an angle, the sweeper can be used for snow removal, whirling snow off to one side.

For More Details Circle No. 21—Page 223

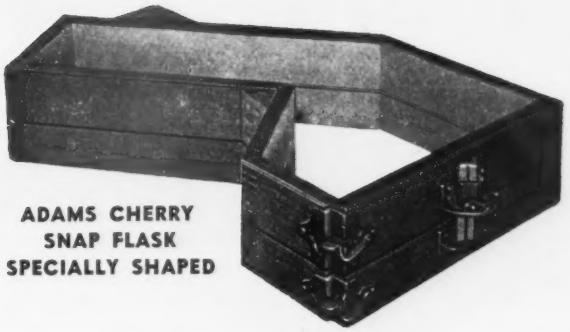
Furnace Door: Blaw-Knox Co., 2097 Farmers Bank Bldg., Pittsburgh 22—New type door is designed for a rammed lining for use in open hearth and other high temperature



metallurgical furnaces. Feature of the design is the use of special spring clips and rivets with countersunk

(*Continued on page* 232)

ADAMS ALUMINUM
SLIP FLASK



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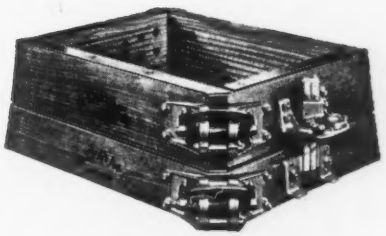
For "All-Out" Production use

ADAMS-BUILT

FLASK EQUIPMENT

Tell us <u>now</u> what you'll need

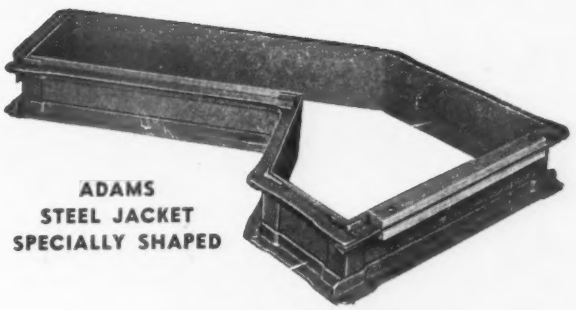


ADAMS CHERRY
EASY-OFF FLASK

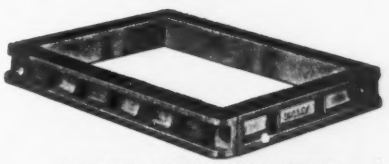
Lest the rising tide of "all-out" production swamp you with unfilled orders . . . we urgently request that you review the needs of your foundry for molding machines, flasks and allied equipment.

If you will then place your order at once, we shall make every effort to deliver your equipment on the date you must have it.

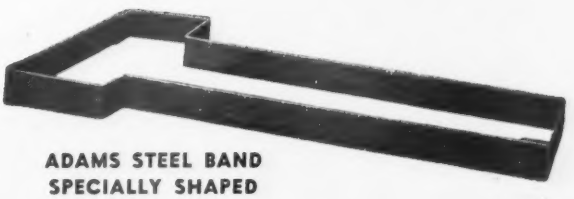
As you know, the battle of the production line is not won with "rejects". *Adams-Built* molding machines and flask equipment will help you to maintain peak production of high-quality castings, reduce rejects and lower production costs. May we hear from you now?



ADAMS
STEEL JACKET
SPECIALLY SHAPED



ADAMS ALUMINUM UPSET



ADAMS STEEL BAND
SPECIALLY SHAPED

THE ADAMS COMPANY
800 Foster St. **Dubuque, Iowa**

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

Foundry work moves faster with

To meet demands for greater production and higher efficiency, many progressive foundries are replacing obsolete, undependable handling equipment with new heavy duty, two-speed Meteors. Designed specifically for foundry work, the Meteor provides slow speed for careful starting of loads... and high speed for fast lifting when the load is free. The Meteor is fully enclosed, weather-proofed and protected against dust and dirt. Airplane-type cooling fins quickly dissipate heat generated by gears and load brake. Low headroom, precision construction, motor thermal protection, only 110 volts in push button station, helical gears, are other quality features. If you want extra value for your investment, write today for literature and prices.

WRITE *for Bulletin 142... contains 22 pages of specifications, illustrations and prices.*

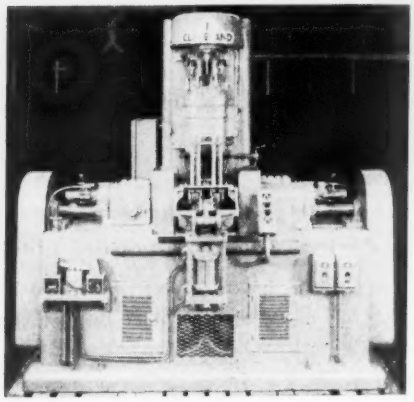
CHISHOLM-MOORE
HOIST CORPORATION
(Affiliated with Columbus McKinnon Chain Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

(*Continued from page* 230)

heads to reinforce the lining and give it satisfactory service life. This design eliminates the need for welding in new studs when the door is relined. Welded to the backplate of the door are the spring clips, into which the countersunk-head rivets are driven. Springing action of the clips holds the rivet head tight against the plate, and this, together with the enlarged contact area of the head, gives good conduction of heat away from the rivet stud. Clip is designed to have a maximum contact area with the water-cooled plate so that the clip itself is well cooled and will not burn off even though the lining becomes very thin. Rivets and clips are easily replaced, it is claimed.

For More Details Circle No. 22—Page 223

Fittings Machines: Cleveland Tapping Machine Co., Canton 6, O.—Automatic tapping machines for macining fittings have air operated, self-compensating jaws for holding the



work. Two fittings are machined simultaneously, and they may be of different sizes. All spindles are interchangeable and have their own hardened and ground lead screw. Lead nut is of gun metal bronze and is adjustable for wear. Machines are adjustable for tees or ells; each head carries its own controls and may be set up independently. Electrical controls operate on 110 v and are mounted in a single panel. Motors are adaptable for 220 or 440 v. Other voltages also are available.

For More Details Circle No. 23—Page 223

Tumbling Machine: Roto-Finish Co., 3600 Milham Rd., Kalamazoo, Mich.—Automatic, pushbutton operated tumbling machine is equipped with a timer that will stop its operation any time up to 20 hr without further attention. It also has a 5-hp, variable-speed power unit with a remote control handle for adjusting the speed of the cylinder from 10 to 30 rpm. Safety switch prevents the machine from operating whenever

(*Concluded on page* 234)

HERE'S YOUR ANSWER

to faster, better, uniform, low-cost blast cleaning

IN A NUTSHELL

That's a broad claim. We don't expect you to accept it without substantiation. We hope you will ask us to present our proof. All we ask, is that you let it be on-*your*-job proof. Proof we know you'll believe! The only proof we want you to accept.

Like many production finishing men, perhaps you have always taken shot and grit pretty much for granted. If so, you have a surprise coming, for Hi-Grade Shot and Grit IS different—so superior, in so many ways—you can only appreciate its true value by job-testing the material yourself. That way you get proof of performance you can accept as conclusive. Order a trial quantity today. We'll let results speak for themselves. You'll find they say, "*Hi-Grade is best by test*"—your answer to faster, better, uniform, low-cost blast cleaning, in a nutshell.

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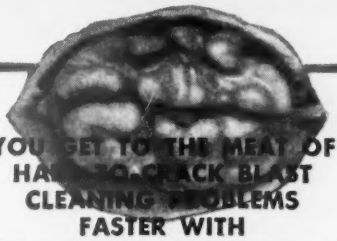

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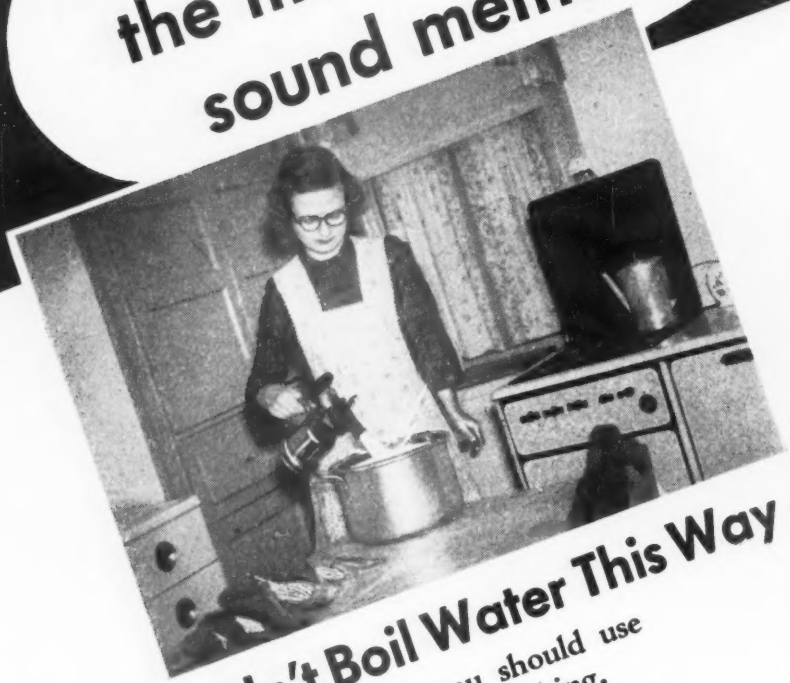
CRUCIBLE MELTING the metallurgically sound method



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There are other reasons why you should use Crucible furnaces for all non-ferrous melting. In crucible furnaces the highest temperature is produced near the bottom of the Crucible. As the melting proceeds the charge sinks into the bath of molten metal. This avoids the metal losses by volatilization and oxidation which occur in any other type of melting.

As the metal is enclosed in the Crucible and protected from direct contact with furnace gases, the danger of gassed metal resulting in porous castings is greatly reduced.

Write for Crucible Melters' Handbook; mailed free.

CRUCIBLE MANUFACTURERS ASSOCIATION

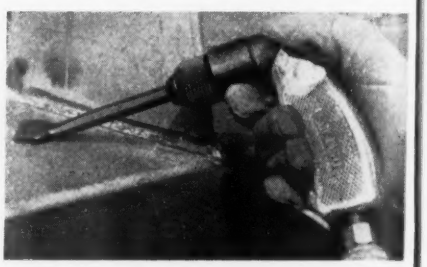
27 Williams Street NEW YORK 5, NEW YORK

(*Concluded from page* 232)

the reinforced safety gate is raised. Cam locks on the doors have spring-loaded pressure releases to prevent excessive pressure build-up within the machine. Each of the tumbler's two compartments has a capacity of 18 cu ft. Machine is of rigid construction and does not have to be bolted to the floor, it is claimed.

For More Details Circle No. 24—Page 223

Air Hammer: Salsbury Corp., Pneumatic Tool Division, 1161 East Florence Ave., Los Angeles 1—Light, air-operated hand tool weighs just over 2 lb, but is designed to perform medium-heavy work duty. Working at 120 psi, the tool strikes up to 6000



blows per minute, with maximum force, or may be metered to any lower speed or striking power by finger trigger. A safety feature is the three-point ball-bearing chuck which locks tools in working position and eliminates hazard of tool ejection. Sixty-six different tools for various applications are available for use with the hammer.

For More Details Circle No. 25—Page 223

Belt Cleaner: Stephens-Adamson Mfg. Co., 100 Ridgeway Ave., Aurora, Ill.—Spring type conveyor belt cleaner has self-aligning, spring steel wiper blades, set perpendicular to the belt surface but diagonal to belt travel, which are designed to wipe the belt clean as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and allow blades to ride easily over obstructions such as belt splices. Dribble from the cleaner falls directly into the rear of the discharge chute at the head end of the conveyor. Wiper is designed to fit existing conveyor installations.

For More Details Circle No. 26—Page 223

Grinding Wheels: Chicago Wheel & Mfg. Co., 1101 West Monroe St., Chicago 7—Silicon carbide vitrified grinding wheels utilize a new bond and are made especially for grinding carbide cutting tools. They are supplied in popular tool and cutter sizes and steel backs for rough and finish grinding, offhand or precision automatic.

For More Details Circle No. 27—Page 223

for easy release of shell molds, use

DOW CORNING 7 EMULSION!

FIRST IN SILICONES
DOW CORNING 7 EMULSION
SILICONE RELEASE AGENT FOR RESIN BONDED SAND SHELL MOLDS
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DOW CORNING CORPORATION, MIDLAND, MICHIGAN U.S.A.

This NEW Silicone Release Agent:

- gives easy release of clean, sharply defined resin-bonded sand shell molds:
- reduces build-up on patterns; cuts pattern cleaning costs; maintains close tolerances.
- It's noncorrosive and nonflammable.
- Easily applied by spraying or dipping, this water dilutable emulsion of Dow Corning 7 Compound is equally effective with various metals; one application will release several shells.

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A COMPLETE LINE OF ALL TYPES OF RADIUS CHILLS

Gates and Heads

(*Continued from page* 109)

Sometimes a clay brick is substituted for the sand, or a core of heavily bonded sand containing a high proportion of silica flour may be used. A typical example of this practice is shown in Fig. 75, page 97, of FOUNDRY for March, 1949, which illustrates a four-way gate core used in making a large hydraulic turbine runner. In this case the tile downsprue was set in the core forming the central opening in the casting, and the metal was fed at four points into the bottom of the mold cavity.

In cement-sand practice, it is advisable to form the bottom of the sprue as an insert core whose face is heavily armored with cement-bonded alumina, which cuts so little that almost no dirt traceable to erosion of the cup ever enters the mold. The same material, with bentonite bond, may be advantageously used in green sand practice, in cases where the importance of preventing washing is sufficient to justify the cost of the alumina.

Protect Sprues and Gates

In this connection, it is hard to understand why it took many foundrymen so long to realize that the sprues, runners and ingates are exposed to the heat of the steel longer, and are in contact with faster-flowing metal than any other part of the mold, and should be faced with the heaviest-bonded sand mixtures in order to minimize the amount of sand carried into the mold. Not so long ago one could still find shops where the mold cavity was faced with the best possible sand mixtures, but the sprues and runners were made up with backing sand, which cut away badly when the steel was poured in, and filled the castings with loose dirt.

To reduce the striking velocity of the stream of metal in a deep mold, the sprue may be offset at one or more points, instead of bringing it straight down to the level of the ingates. When the mold is deep enough to justify this practice, however, most foundrymen today prefer to form their sprues with refractory tile instead of rammed sand. With tile, it is a relatively simple matter to form the necessary off-sets. In making heavy castings, the runners that carry the steel from the bottom of the sprue to the ingates, and the ingates as well, are also generally of tile. Rammed-up runners are as a rule unsatisfactory for this sort of work, because the large volume of steel that must flow through them

(*Continued on page* 238)

ANOTHER EXAMPLE OF

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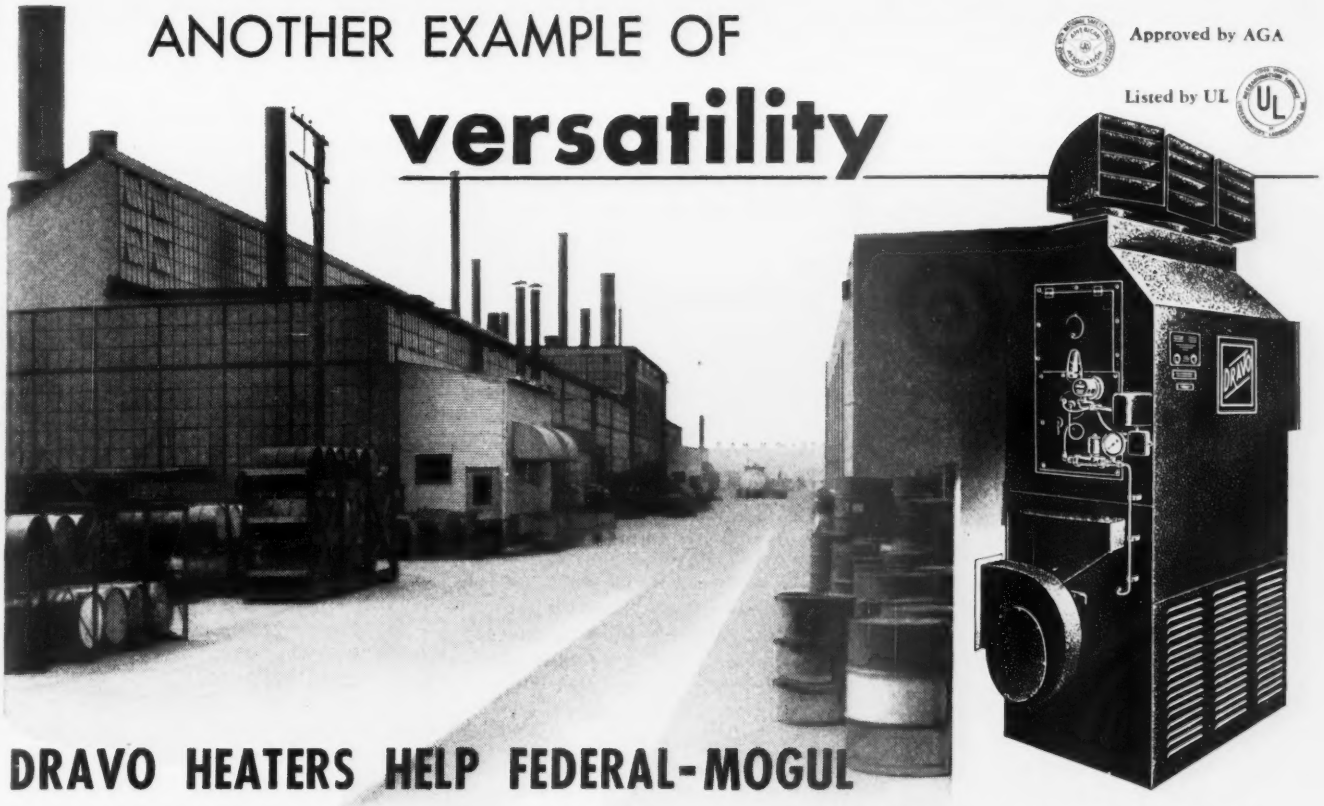

DRAVO HEATERS HELP FEDERAL-MOGUL CORPORATION SOLVE A FOUNDRY VENTILATING PROBLEM

10 DRAVO *Counterflo* HEATERS . . .

- **Keep atmosphere healthy**
- **Equalize pressure**
- **Provide constant temperature**
- **Increase employee morale**
- **Improve efficiency**
- **Step up production**

At Federal-Mogul Corporation's non-ferrous foundry in Detroit, exhaust equipment removes 400,000 cu. ft. of contaminated air per minute to eliminate smoke, fumes, dust and excessive heat. During warm weather, make-up air comes from open windows and doors. But providing warm make-up air in winter was a difficult problem, for natural infiltration did not supply sufficient make-up air and what did enter chilled the working area.

Federal-Mogul solved this by installing 10 Dravo *Counterflo* Heaters at strategic locations in the foundry. Mounted horizontally or vertically, each heater, equipped with automatic modulating controls, produces 22,000 cu. ft. of even temperature air per minute. Heaters are shut down at night, but heat the building quickly next morning. In summer, the units are used for fresh air ventilating.

RESULTS: Normal atmospheric pressure maintained, facilitating exhausting of heavy gases; improved comfort; healthier working conditions; increased worker efficiency; improved morale, better production records!

VERSATILE DRAVO HEATERS ARE AT WORK IN MANY TYPES OF INDUSTRIAL AND COMMERCIAL APPLICATIONS

Dravo *Counterflo* Heaters are ideal for space heating and ventilating in warehouses . . . machine shops . . . railroad repair shops . . . process industries . . . stores . . . schools . . . churches . . . military installations.

DRAVO HEATERS OFFER YOU . . .

- **Low initial cost . . . users report 30% to 60% savings.**
- **Concentration of heat at working level.**
- **Low Fuel consumption . . . burn gas or oil . . . easily converted.**
- **Automatic Control . . . on-off or modulating controls.**
- **Long service life, low maintenance . . . stainless steel combustion chamber.**
- **Mobility . . . easily moved to any location.**
- **Flexibility . . . where floor space is limited, can be wall-hung or suspended from trusses.**

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Export Associates: Lynch, Wilde & Co., Washington 9, D. C.

(*Continued from page* 236)

cuts and washes the sand severely. Fig. 34, page 77 of FOUNDRY for January 1949, shows the tile runners and ingates used to pour a large hydraulic press cylinder molded in cement-bonded sand. The refractory tile sprue which carried the steel to the bottom of this mold is not shown in the illustration.

It shoud not be taken for granted that because tiles are used for sprues and runners, no foreign material will be dislodged from those passages and carried into the mold cavity. At times soft or improperly burned tile will be found to have eroded almost as badly as rammed sand, and the slag-like material formed to have been trapped in the mold. It is not often, of course, that a defective lot of tile is received, but the foundryman should be ever on the lookout for it.

As mentioned in the section on machine molding[4], tile runners as a rule cannot be used when the mold is to be made on a jolter, because the jolting moves the tiles out of position. Occasionally, however, it is possible to set them in place after the mold is rammed up, either by digging out the sand or by setting them in prints formed by suitable pieces on the pattern . The tiles, of course, are then held in place by ramming sand around them by hand. In hand molding or in using a slinger, tiles can be set wherever desired, and are used in practically all cases where a large amount of steel is to be run through the gates and runners. Vertical tile sprues can be used in any method of molding, but when the mold is made on a jolt squeezer there must be an opening in the squeezer board to fit around the tile.

When tile sprues are used, it is often advantageous to obtain tile pouring cups that are set on top of the sprue tiles and held in position by the sand at the very top of the cope. Though separately rammed pouring cups, set on the cope, sometimes can be made cheaper than these tile ones, the time and labor required to set the separate cups in position may wipe out much of the apparent saving.

When comparatively shallow castings of large area but light section are to be poured, the sprues are usually made up of tile, but the long runners that carry the steel to the ingates may be formed in the sand of the mold. The large light-section casting, the pattern for which is shown in Fig. 12, page 82 and Fig. 15, page 84 of FOUNDRY for August, 1949 illustrates this practice. The runner for this piece is formed in the sand of the cope, its fourth side being the flat surface of the drag. A central tile sprue carries the steel to this runner, which in turn leads to a number of specially shaped gates, formed in cores which are set in the drag, and feeding the metal into the lowest portion of the casting. Fig. 16, page 92 of FOUNDRY for December, 1948 shows a pattern for a much smaller casting, in which the runner is formed in the rammed sand.

Instead of molding the runners in the facing sand, they may be made in cores of heavily bonded sand, set into spaces formed in the mold by properly shaped prints on the pattern. In some cases such a core forms only three sides of the runner, the fourth being the sand of the cope; in others the opening is made entirely in the core. This practice frequently is resorted to when it is thought that so much metal must be poured through them that runners formed in the sand of the mold would be severely eroded.

In modern practice, rammed-up sprues and gates may be replaced by tile or cores, even for comparatively small castings. Figs. 1, 2 and 3 illustrate a method developed by F. B. Riggan and A. E. Czeckowicz of the Key Co.[5] In this method, a combination pouring cup and a sprue made as a core was found to be cheaper than either tile or a rammed-up sprue and separate pouring cup set on the cope. Fig. 1 illustrates four sizes of this core and one core sectioned to show the shape of the inside. In Fig. 2 one of the cores is shown set on the pattern board, with a rubber pad to absorb the shock of the jolter, and in Fig. 3 the core is shown in place in the completed mold.

Gates Are Larger

Since steel does not flow as freely as gray cast iron and other metals that are highly fluid when molten, the various complicated gating systems used in iron foundry practice are unsuitable for steel casting molds. Strainer cores, slag traps, relief sprues and similar devices so largely used in pouring cast iron, are seldom seen in steel foundries. The ingates for steel castings, too, are considerably larger in cross section than those used in cast iron practice, which are often so small that they would be eroded severely if steel were poured through them, and would not permit the steel to flow fast enough to produce a clean casting free from cold shuts and surface imperfections.

This is particularly true of castings in which the steel has to flow a considerable distance in a shallow sheet over a horizontal surface. In that case, the metal does not move forward freely, like water or cast iron, but advances more in the manner of a lava stream, partially freezing over at the top and the front of the moving mass of metal, momentarily checking its advance and then breaking through the thin skin of semi-solid steel, and as the foundryman

(*Continued on page* 240)

FOUNDRY STUDENTS in mechanical engineering department, University of Idaho, Moscow, Idaho, pouring off aluminum castings after making the molds. Later they machine and assemble the castings to form a table saw as their project in machine tool laboratory course No. 2

THIS MONTH, 62,562* BUYERS OF CASTINGS WILL READ THIS AD...

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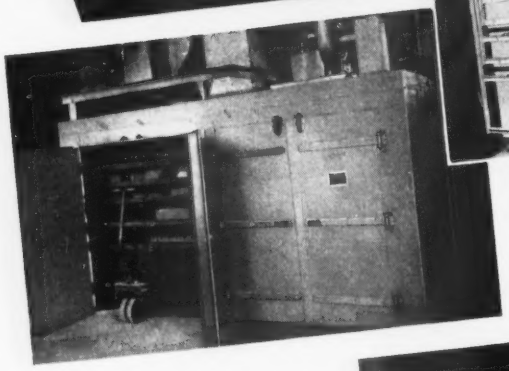


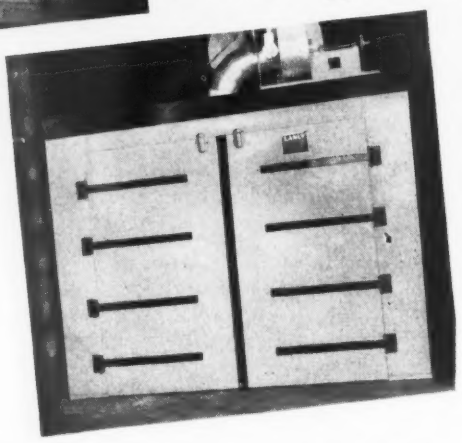
(Above) Drawer Type Oven.

(Left) Two Compartment Rack Type Oven.

THE oven requirements of the average foundry can be met with standard LANLY units.

Custom designed units for core baking, pasting and mold drying are part of LANLY'S services, as well as ovens for casting conditioning and heat-treating.

Write for the Catalog.



Rack Type Core Oven

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
780 PROSPECT AVENUE CLEVELAND, OHIO

(*Continued from page* 238)

says "rolling" forward. In fact, it will sometimes be found that, instead of pushing loose sand in the mold ahead of it, the steel will crawl over such a barrier, which will be found as a dirt spot on the drag surface of the casting. The same thing is true of loose dirt floating on the surface of the steel as it rises in a fairly deep mold—not only will this loose material be found trapped against the surface of the cope, but some of it will even stick to vertical or slightly inclined surfaces of the mold and be covered by the rising metal.

Steel Freezes Gradually

The smaller the opening into the mold, in comparison with the cross-sectional area of the casting, the greater the tendency of the steel to freeze partially on the surface in this manner. In extreme cases, when a gate of inadequate size is used, the two streams of steel flowing around a core will fail to unite completely, and will form what is known as a "cold-shut." In fact, when the steel is flowing over a large surface where the total thickness of the casting is small, as in the thinner parts of large steam turbine castings and similar castings, small cold-shuts sometimes form even where there is nothing to interrupt the flow of the metal. Apparently these defects are formed in such cases simply by the metal breaking through the semisolid skin near the top of the moving stream, and flowing down over the front of the advancing steel, as illustrated in Fig. 4.

The sprues, runners and ingates, therefore, are made large enough to admit the steel in such volume that it will fill the mold rapidly and thus be chilled as little as possible by the sand surfaces over which it must flow. There are as yet no rules for estimating the proper sizes of ingates, runners and sprues to use in molds for steel castings of different weight and shapes, so that the foundryman has to be guided by experience.

When the steel is poured with a nozzle and stopper, the cross-sectional area of the sprue should never be smaller than that of the nozzle, because if a small sprue is used, it will not take the full stream from the ladle, and the operator is compelled to raise his stopper only part way off the seat. The stream then fans out in every direction and usually spills over the edges of the pouring cup. To make sure that the sprue will take full stream from the ladle, it

(*Continued on page* 242)

Constructed to Take Severe Punishment

Without Tube Swelling

CONCORD #20 STEAM HOSE

Here's the steam hose with a structural difference that eliminates . . . once and for all . . . the common failure of tube swelling under continuous high pressure operation.

CONCORD #20 Steam Hose gives you the exclusive protection of a tough inner lining . . . a lining of stainless steel wire braid. This braid assures permanent retention of the original inside hose diameter. It prevents swelling and constriction of the tube . . . assures full flow of steam at all times . . . permits re-coupling in the field when necessary, without the slightest difficulty.

In addition, CONCORD #20 construction features include: two or three braids (depending on size) of alternate high tensile steel wire and rubber layers are firmly bonded over the outside of the tube. They provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and serves as cover insulator. On top of all is the rugged, abrasion-resistant cover that withstands the severest abuse.

Flexible, tough and dependable . . . that's BWH's new CONCORD #20! Ask your nearby BWH distributor for a demonstration. Get in touch with him today, or write us direct.

Tube Securely Locked by Special Stainless Steel Inner Wire Braid!

Illustration above shows how exclusive inner stainless steel braid of CONCORD #20 Steam Hose prevents tube swelling and assures long life under severe use.

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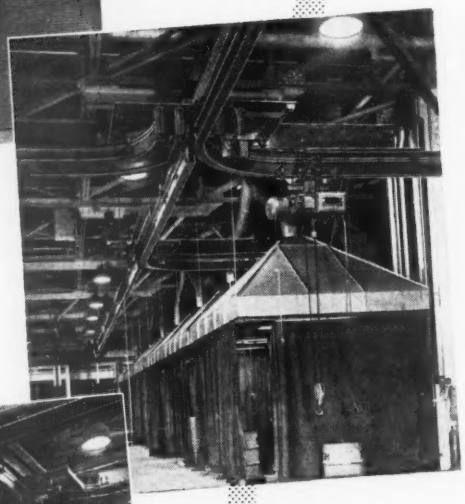
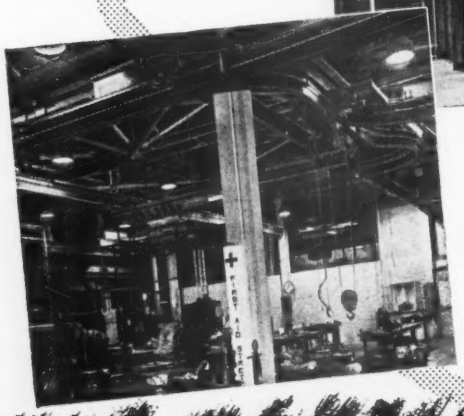
BWH DEPENDABLE RUGGEDNESS

Railmaster 3-ton crane serves the paint shop area and interlocks via track curve with crane serving the sand blast room. Interlocking track is equipped with opener to allow fire door closure.



Track and switches with spur tracks over welding booths for easy spotting of heavy loads in booths.



Compact track and crane system over the electrical shop area. Note hand chain drop section on extreme left, which lowers a hoist carrier for service or repair.

MONORAIL REDUCES
Maintenance Costs

In this, one of the country's largest maintenance shops, American MonoRail Overhead Handling Equipment serves the entire department. Included in the department are: machine shop, electrical repair, metalizing room, welding, painting and sand blast room, pipe shop, and inside and outside storage. This plant has shown a definite increase in efficiency and a great reduction in handling costs.

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WRITE FOR C-1 BULLETIN

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE ● CLEVELAND 7, OHIO

(*Continued from page* 240)

must actually be somewhat larger than the nozzle through which the steel is poured. When a small ladle is used, the difference in size need not be very great, but with very large ladles which discharge the steel at high velocity when first opened up, the sprue must be considerably larger.

Often a 4-in. sprue is required to take the full stream from a 3-in. nozzle. The sprue, however, should not be so much larger than the nozzle that the stream will not fill it when the stopper is raised as far as it will go. If it is found that a casting of a given pattern is being filled too slowly, so that cold-shuts are formed, or fine details are not properly filled out, both sprue and nozzle should be made larger. When the steel is handled in a tea-pot or lip-pour ladle, and a larger sprue is required, it can be kept full simply by pouring faster and in a bigger stream.

Regulate Size of Sprue

To control the rate of entry of the metal into a mold properly, the size of the sprue should bear a definite relation to that of the runners and gates. In his 1914 AFS paper mentioned previously, the present author stated that the total cross-sectional area of the gates should be the same as that of the sprue. If the area of the ingates is less than that of the sprue, he pointed out that the latter will rapidly fill up with metal. The pressure on the steel entering the mold in the early stages of pouring is then so greatly increased that it will flow at very high velocity, and will cut the mold severely. As the mold fills, however, the rate of inflow progressively decreases, and the total time required to fill the mold is greater than if larger gates had been used.

This reasoning is apparently correct, and in fact is substantiated to a certain extent by the results of some recent experiments carried out at the Armour Research Foundation under the direction of the Technical Research Committee of the Steel Founders' Society of America. In those tests, steel was poured into molds of various shapes through gates whose cross sections were in some cases equal to those of the sprues through which the steel was run, in some cases smaller and in still others larger. In a brief published summary of these experiments[6] it was stated that "single ingate systems cause more mold cavity erosion than multiple ingate systems. The smaller diameter ingates produce the

(*Continued on page* 244)

SEALED BURNER

with Flame Failure Protection and Constant Pilot

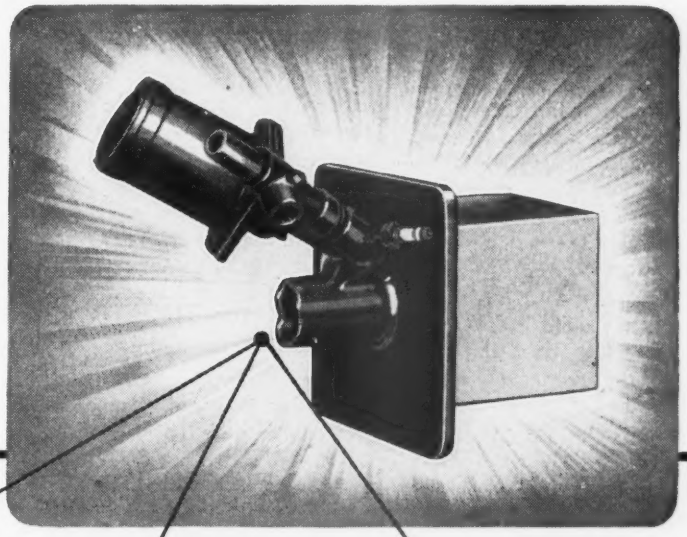
Another McKee Eclipse *Advancement*

"PW"

McKEE *Series*

PILOTED WALLTITE BURNERS

PATENT APPLIED FOR



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McKee Piloted Walltite Burners. For use with premixed air-gas mixture supplied by some form of outside mixer. Capacities 13,000 to 1,070,000 BTU per burner using 16 oz. air. For details write for Bulletin H-61.

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McKee Eclipse

(*Continued from page* 242)

most mold erosion regardless of the gating system used. Ingate areas in excess of the sprue area do not always result in the least amount of mold cavity erosion. Fast filling with low velocity ingates tends to produce plate castings with a minimum of mold cavity erosion".

In his 1914 paper, the author also stated that "in most cases, there will be no object in making the area of the ingates greater than that of the sprue," since the size of the sprue limits the volume of metal that flows in a given time, and larger gates will not make the mold fill up any faster. This conclusion, however, ignored the factor of the velocity with which the steel flows through the gates. With a given size of sprue and a definite amount of metal flowing down the sprue in a given time, the velocity with which the steel enters the mold is progressively decreased as the area of the ingates is increased. This is necessarily true, since the larger the cross-section of the gates, the slower the metal need flow through them to carry off the fixed amount of steel per minute that passes down the sprue.

To avoid cutting and washing of the sand in and near the gates, therefore, the area of the gates may very well be made considerably larger than that of the sprue. Some foundrymen of long experience in the production of large steel castings even believe that, in deep molds, the area of the ingates should be as much as four times that of the sprue, to make certain that the steel will enter the mold at very low velocity and thus cut the sand as little as possible. This view is in agreement with the conclusion of the Armour Institute investigators, quoted previously, that "fast filling with low velocity ingates tends to produce plate castings with a minimum of mold cavity erosion".

When a single ingate is used to carry the metal into a portion of the casting lying in a horizontal position, and of considerable area, the gate generally is fanned out, with the larger portion next to the casting, like a flattened funnel with the small end at the bottom of the sprue. This is done with the idea of making the metal flow into the mold cavity in a wide stream at low velocity, instead of the fast-flowing narrow one that would be formed if the gate were of uniform width from end to end. There have as yet been no experiments carried out to see whether in fact the metal stream widens as it advances through a gate of this shape, or whether its momentum restricts it to a comparatively narrow area. It seems hardly possible, however, that it would not widen at least to some extent, and as the area of the gate where it enters the mold is larger than that of the sprue, the stream will certainly enter the mold at lower velocity than if the gate were not fanned out.

Use Several Gates

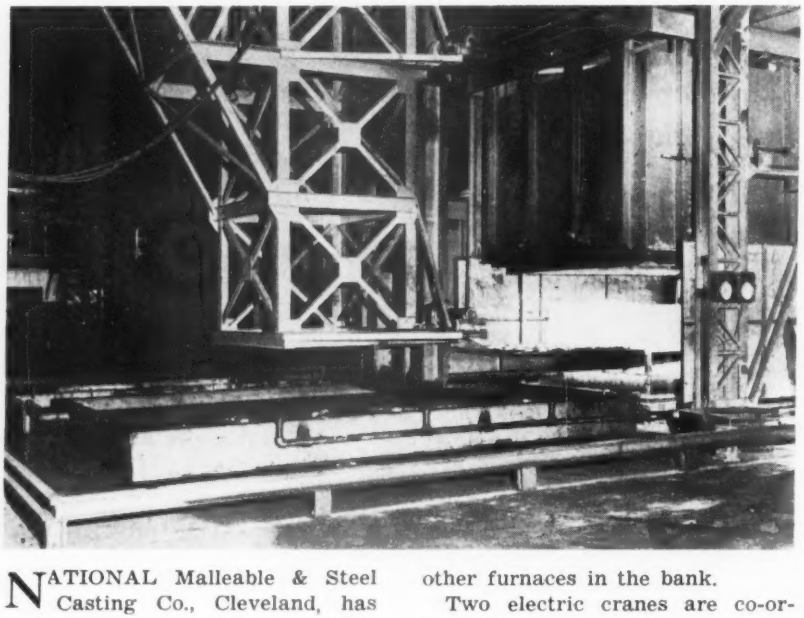
If the casting is so wide that a single gate will not fill it fast enough, the usual practice has been to use a runner nearly as long as the casting is wide, which distributes the steel to two or more ingates so located as to feed the steel into the mold cavity at a number of points, as illustrated in Fig. 5. The action of the "finger gates" is described in two articles giving the results of experiments carried out at the U. S. Naval Research Laboratory, and is also briefly referred to in the summary of the Armour Research Foundation work mentioned before.

An important point brought out in both these sets of experiments is the influence of the momentum of the flowing stream of steel in the early stages of filling a mold, which causes the metal to largely by-pass the ingates A-A closest to the sprue, and flow in the greatest volume through the end gates B-B. Having traveled the greater distance over the sand, of course, the steel entering the end gates is noticeably cooler than the smaller quantity that is delivered by the gates close to the sprue. In all the experimental work described in these articles, the mold was comparatively shallow, and it is by no means certain that the steel would continue to flow in the greatest volume through the end gates when filling a mold several feet deep.

Apparently, however, once flow is established in a given direction, it tends to continue to follow the same path, so long as pouring is not interrupted. If the stream is cut off

(*Continued on page* 246)

Foundry Installs Electric Annealing Furnaces



NATIONAL Malleable & Steel Casting Co., Cleveland, has installed five electric annealing furnaces. Three are high temperature furnaces rated at 390 kw, 460 v, 3 phase, 60 cycles, maintaining a temperature of 1800° F; two are low temperature drawing furnaces, rated at 230 kw, 460 v, 60 cycles, with a maximum operating temperature of 1300° F.

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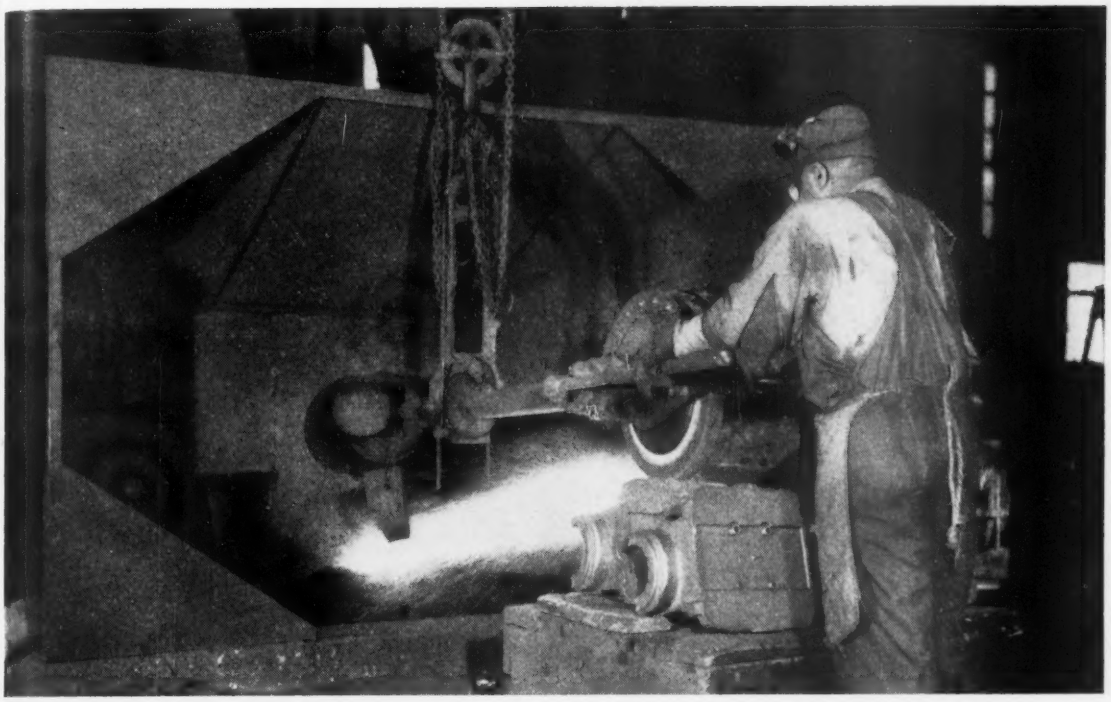

ROTO-CLONE makes a dust storm disappear for keeps

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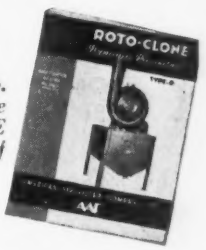

Write for Bulletin No. 272A describing the Type D ROTO-CLONE and its wide variety of applications.

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(*Continued from page* 244)

long enough for the steel to stop moving, however, and pouring then is resumed, the tendency would probably be for the metal to enter to a greater extent through the nearer gates, since it would require less energy to overcome the resistance to flow in the shorter runners than in the longer ones leading to the end gates. This possibility was not explored in the work at the Naval Research Laboratory, because in order to maintain uniform pressure in the flowing metal in their experiments, the steel was fed to the sprue from a pouring basin which had no stopper to cut off the flow of metal once it was started.

In the work at the Naval Research Laboratory, the effects of various changes in the shape and location of the runners and ingates were studied, with a view to determining the best means of securing uniform flow in finger gates. The most effective method appears to be to vary the depth of the runner, making it shallow immediately adjacent to the down-sprue and growing progressively deeper toward the ends, so that the metal does not reach the end gates with the same momentum that it possesses when the runner is straight and of uniform size throughout.

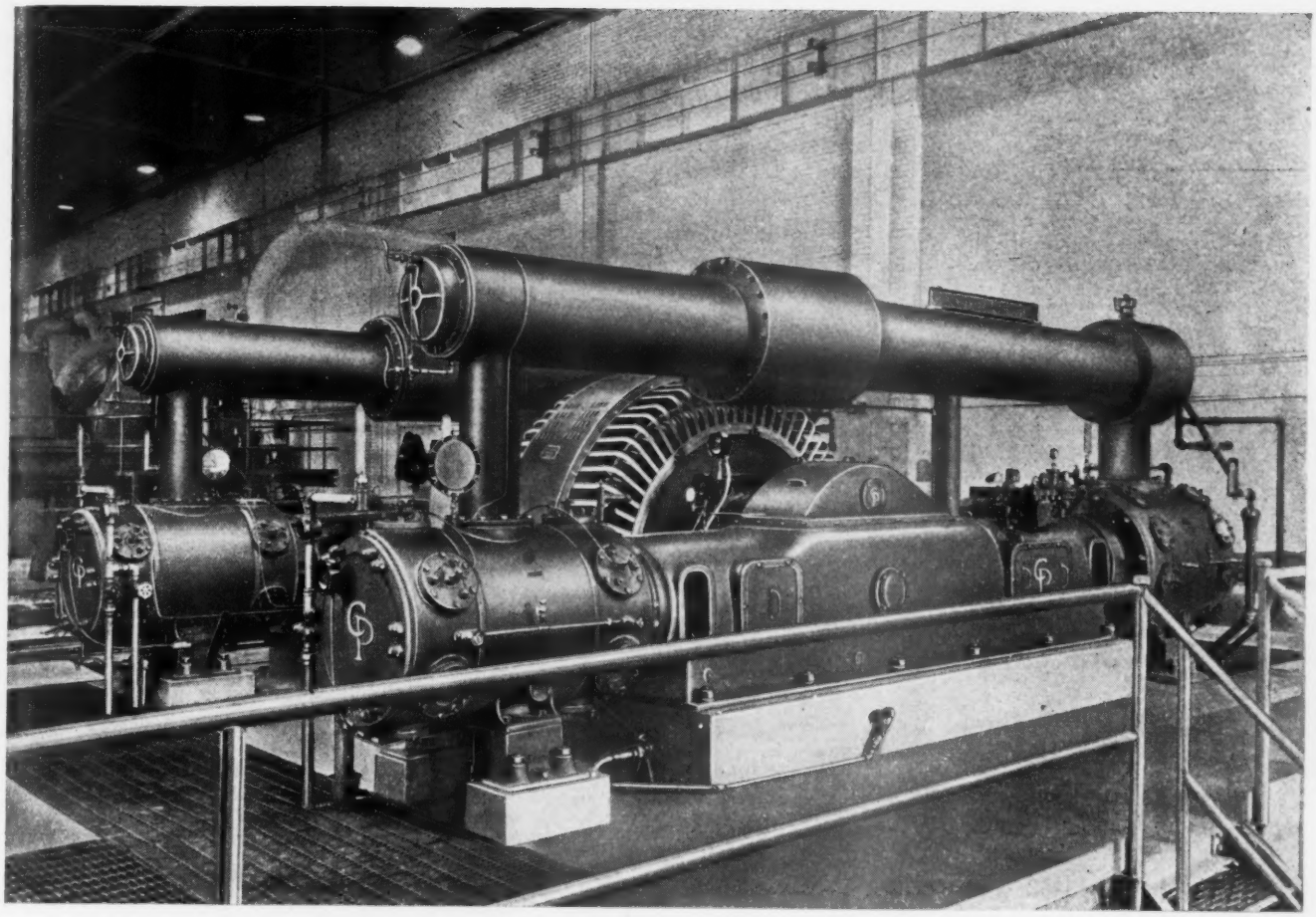
Small End Horn Gates

To lead the metal into the bottom of comparatively small castings, instead of feeding it horizontally from side gates, what are known as "horn" gates are sometimes used. These are formed by means of C-shape pieces of wood or metal, which are rammed up in the sand of the drag, and removed when the flasks have been rolled over to draw the patterns. To make them readily removable, the patterns for horn gates are tapered quite heavily, as indicated in Fig. 6. As usually molded, the small end of the horn is next to the pattern, so that the actual ingate is of considerably smaller cross-section than the sprue.

For reasons already given, this is just as undesirable as it is to have horizontal gates smaller than the sprues. Briggs[8] makes the suggestion that the horn gate be reversed, with the large end next to the casting and the small end connected to the sprue. To avoid having a constricted spot where the sprue and the horn gate meet, it would then be desirable that the small end of the horn gate be of the same size as the sprue.

If the latter is made large enough

(*Concluded on page* 248)



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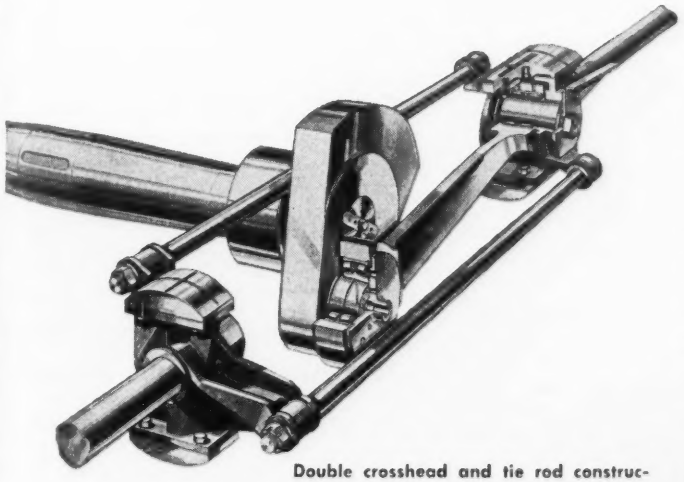

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(*Concluded from page 246*)

to pour the casting at the desired rate, this arrangement may result in the horn gate being undesirably large where it joins the castings; and it is not always possible to withdraw a horn gate pattern through the actual mold cavity, as would be necessary if the taper of the horn gate were reversed. Though the horn gate is the cheapest method of leading metal to the bottom of small molds, it is often advantageous to substitute for it a gate made in a core, set in a suitable print when the mold is closed.

(*To be continued next month*)

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2. John Howe Hall, "Defects in Steel Castings and Remedies for Them," *Transactions*, American Foundrymen's Society, Vol. XXIII 1914, page 537.
3. George Batty, "Controlled Directional Solidification," *Transactions*, American Foundrymen's Society, Vol. XLII, 1934, page 237.
4. FOUNDRY, October, 1949, page 179.
5. Fred B. Riggan and Harold Schulte, "Heading and Gating Practice," FOUNDRY, May, 1950, p. 134.
6. FOUNDRY, November 1949—"Research and Product Development Discussed at T & O Conference."
7. W. H. Johnson and W. O. Baker, "Gating Systems for Metal Castings." *Transactions*, American Foundrymen's Society, Vol. 56, 1948, page 389. W. H. Johnson, W. O. Baker and W. S. Pallini, "Principles of Gating," FOUNDRY, July, 1950, page 701.
8. C. W. Briggs—*Metallurgy of Steel Castings*, page 254.

Book Review

Proceedings of the American Society for Testing Materials, cloth, 1490 pages, 6 x 9 inches, published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $12.

This Volume 50 contains, in addition to a summary of the 1950 annual meeting of the society, presidential address and annual reports of the board of directors, all the technical committee reports and technical papers presented. Included are reports from 58 technical committees and 45 technical papers with discussions. In addition, the book contains 12 papers presented at the first Pacific Area meeting of the society held the latter part of 1949.

Publishes Safety Reports

Foundry committee, metals section, National Safety Council, 425 North Michigan Ave., Chicago 11, has started issuing a "Foundry Safetygram" describing a foundry accident and suggesting how it could have been prevented. The committee solicits reports of accidents and suggested preventive measures which it will publish in future issues of Safetygram. The publication will be mailed to NSC members requesting it.

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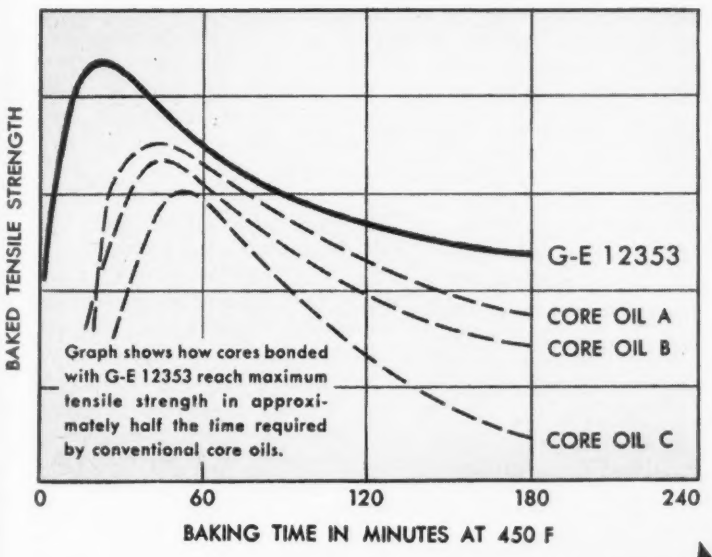

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How to use the CUPOLA

By BERNARD P. MULCAHY
President
Fuel Research Laboratory Inc.
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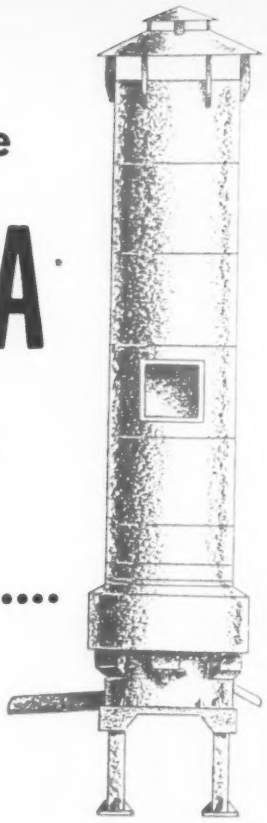

Fluxing the cupola melt, and the importance of a reliable temperature log of the heat, are subjects treated in this eleventh article of a series

A CUPOLA melt of any duration (over 1 hour) should be fluxed. The undesirable materials to be removed are coke ash, rust and dirt on purchased scrap and sand on returns. The flux also is an aid in sulphur reduction.

Fluxing furnishes a medium of a nonsoluble (in iron) liquid to absorb the extraneous material listed above and lowers the melting point of the refractory component to make it sufficiently liquid at existing temperatures so that it will separate readily from the iron and thus can be removed.

Many of the materials in the slag are acidic in character, which opposes the absorption of sulphur so that an attempt is made to keep the flux basic to neutralize this acidity.

Limestone, of course, is the principal fluxing material used. This is either high calcium or dolomite (mixture of Ca and Mg carbonates).

Fused sodium carbonate is widely used to assist in sulphur reduction because of its alkaline nature.

Fluorspar, either native or as a principal component of commercial fluxes, is also widely used to increase the fluidity of the slag. This it will do very effectively without, however, any effect on the alkalinity of the slag.

The amount and kind of flux required is a direct function of the other materials used and the mode of operation. For normal materials and normal operation the correct amount of good limestone would be 3 to 4 per cent of the metal charge. For example, a 2000-lb charge would require 60-80 lb. limestone.

Poor patching practice will require additional limestone. This is so because if the refractory falls off or pulls away from the walls, this material, because of its refractory nature, will require a considerable reduction in its melting point in order to be removed. Heavy quantities of sand adhering to the returns or dirty and rusty scrap will require additional limestone for the same reason.

Poor air distribution or tuyere arrangement, or improper construction, size or location of the slag hole will require additional flux to remove the slag, prevent the formation of a "bridge" or loosen a "bridge" already formed.

Frequently too much flux is used. This is reflected in a high slag volume and possibly excess erosion. No good is accomplished under these conditions and refractory losses are high. When too little flux is used the slag will be stiff, and the slag hole may plug frequently during the heat.

Normal patching materials are acid in character and this fact plays an important part in the final composition of the slag, the burn-out of the lining, the amount of flux required and the purity of the metal flowing from the cupola spout.

We cannot divorce the chemistry of the slag formation from the chemistry or metallurgy of the metal. For example, a high state of oxidation within the cupola invariably results in poor metal. But the oxidized state of the metal has been aggravated by rendering the slag impotent. This same effect is noted when highly rusted or oxidized scrap (burned iron) is part of the metal charge.

Excessive erosion, occurring regularly in the same locality of the cupola, in most instances will be due to poor distribution of the air. This can be corrected (if the tuyeres have sufficient total area) by reducing (gradually) the tuyeres at this eroded zone.

Concentration of the flux in the same area each time in charging can cause excessive burn-out, although actually this cause is less frequent than commonly thought. When adding the flux to the charge a good general distribution is better than localization.

Bridging in a cupola is due less to fluxing material or its manner of addition than to the conditions within the cupola which permit the slag to freeze at the tuyeres.

It must be remembered that the air entering the tuyeres is cold and can cause rapid chilling of the slag at this point. Preheating the air as in hot blast operation, or boshing or periodic closure of the tuyeres in sequence (balanced blast, lower tuyeres) all aid in overcoming this condition.

The most common and serious situation surrounding fluxing practice is poor patching practice, and by this is meant application of the materials used rather than the materials themselves. Correction of this one item will go a long way to permitting the flux to function properly.

Temperature Significance — Probably the most important index of the state of operation of a cupola is a reliable temperature log of the entire heat.

The term "reliable" is emphasized, for all too frequently temperature measurements (by optical pyrometer) are erroneous because of the following factors:

1. The eyepiece of the instrument is dirty.
2. The battery is low.
3. The instrument itself is in error.
4. The operator has been improperly instructed in the use of the instrument.
5. Readings are taken at an improper surface of the metal.
6. Readings are made on a surface containing an alloy addition.

(*Continued on page* 252)

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(*Continued from page* 250)

Fortunately most of these sources of error can be readily eliminated with a little care.

If the eyepiece is dirty, a low reading results. The eyepiece and end glass should be wiped off daily before use.

A low battery is reflected by an erratic movement. The batteries should be replaced regularly.

If the instrument itself is in error it can only be checked against some other standard instrument or against another instrument recently calibrated. All pyrometers require periodic checking.

The operator should be instructed by someone competent to do so. This can be arranged between shops in the same community.

In reading the metal only a spot on the surface free from films should be used. This will occur generally at the elbow of the stream where it turns downward. In many instances a flat quiet stream carries a bright film, giving a reading too high. Only the darkest part of the stream should be read. This applies also to a stream to which alloys have recently been added. If alloys are fed constantly, read before or in front of the alloy addition.

Temperature Reading Important

The importance of a temperature log goes beyond just the knowledge of the metal temperature. While temperature is highly important it is only part of the potential information. For example, let us say that the start of pouring has been satisfactory and the metal reached 2800° F + 20-30 minutes after tapping. Shortly thereafter, however, the temperature showed a gradual drop until it leveled off at say 2700-2720°. What does this mean? If this is contrary to previous experience it may indicate a change in the coke, either a new (poorer) coke was used or the old coke may be smaller than that used previously.

If, on the other hand, this drop is occurring regularly, it may be due to insufficient coke/charge, or too much air.

Again, suppose that the temperature levels off at a satisfactory level for several hours and then a temperature drop is noted. This may be due to heavy scrap arriving in the charges or the tuyeres may be plugging up due to bridging.

These examples will clearly indicate that in temperature reading we have a quick and reliable index of conditions existing within the cupola, and, of course, some action should be taken immediately to correct these

unsatisfactory operating conditions.

When temperatures are affected as listed above, not only does the metal suffer in this regard, but we also know that combustion conditions are wrong and the chemistry of the metal is additionally affected. Oxidation has undoubtedly increased, silicon probably has dropped and the carbon also may be lowered. The physicals of the metal also have unquestionably been affected.

When combustion conditions are correct we will have:

1. High and steady metal temperatures.
2. Minimum coke costs.
3. Steady chemical composition.
4. Steady physicals.
5. Uniform melting rates.

In general, high metal temperatures accompany good melting conditions; there are, however, one or two notable exceptions. For example, it is not unusual to have high metal temperatures reported in error. This can be caused by sighting the pyrometer on the "film" of the metal stream which is always brighter than the stream itself. Such a "film" is caused by oxidation (actual, in cupola) or by alloy additions to the stream. This condition is easily proved by checking the results of pouring. Such metal freezes quite early and misruns increase.

(To be continued next month)

Book Review

1950 *Supplement, ASTM Standards, Part II, Nonferrous Metals*, paper, 223 pages, 6 x 9 inches, published by the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., price $3.50.

This 1950 supplement to Part II on nonferrous metals, of the 1949 *Book of ASTM Standards*, contains the extensively revised standards and the new and extensively revised tentatives in the nonferrous metal field which have been accepted since the appearance of the 1949 book of standards. The ten standards are replacements of existing standards; similarly, 29 of the 31 tentatives are replacements, while the remaining two are published for the first time. Fourteen tentatives adopted as standard in 1950 without revision and seven tentatives and standards with minor revisions, are listed in the contents but are not published in this supplement.

Yellow stickers are included with the supplement for affixing in the 1949 book to call attention to various standards and tentatives which have been superseded, or have minor revisions, or which have been completely withdrawn.

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A Chronology of **....RADIUM RADIOGRAPHY**

1930— First commercial use of gamma rays; radiograph made of sternpost of cruiser "Chester".

1935— First purchase of radium for industrial radiography by Westinghouse; bought from Radium Chemical Co., Inc.

1938— AFA questionnaire revealed that 8% of steel casting men used radium radiography.

1941— 22% of steel casting men bought, rented, leased or employed radium for radiographic purposes.

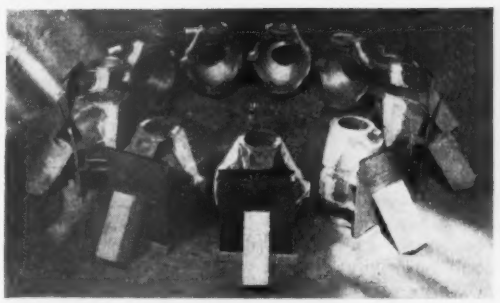
1946— 150 steel foundries rented or leased radium.

1947— American Society for Testing Materials issued Radiographic Standards for Steel Castings. (Gamma Ray). E71-47T.

1948— 200 steel foundries rented or leased radium.

1949— Revision of the U. S. Navy Universal Exposure Calculator for Radium Radiography by N. A. Kahn, E. A. Imbembo and J. Bland, New York Naval Shipyard, Brooklyn, N. Y.

1950— 250 steel foundries rented or leased radium.



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Nickel-Silver Castings

(*Continued from page* 95)

mechanical equipment, parts of bottling and food-processing machinery, and ornamental fixtures or trim on buildings and furniture. Since this composition is built upon a nickel-alloyed Ounce metal base, it is not uncommon for castings to be finished and polished at less cost than obtains for plated brass castings. The end product, compared with platings, will possess much more durability, and, in many cases, is designed to function for lifetime periods.

Foundry Practice—Foundry practice for the nickel-silver alloy has been described in considerable detail[1]. A 20 per cent nickel alloy of the 11-A type in Table I might be selected as an example. The reasons for the tin, lead and zinc contents have been discussed above. Confusing the nickel-silvers with the cupro-nickels sometimes leads to the assumption that iron, silicon, carbon and manganese may be tolerated in considerable amounts. The preferred maximum impurities in nickel-silvers should be: Iron 0.50 per cent, manganese 0.25 per cent, silicon 0.05 per cent, sulphur 0.035 per cent, carbon 0.10 per cent.

Remelt should be cleared of iron, sulphur, carbon and silicon. Silicon is highly detrimental. Pressure castings in this alloy should contain no more than 0.05 per cent residual silicon. Melting should be rapid to avoid gas absorption. For the same reason, crucibles should be covered or contents fluxed with inert fluxes such as glass mixed with salt, borax or lime. A triple deoxidation with manganese, magnesium and phosphorus is recommended after compensating for any zinc loss.

Temperature control in melting and pouring is highly desirable. Pouring temperatures are indicated in Table I. Test slugs, cast prior to pouring the molds, help indicate whether deoxidation has been effective. Casting may begin as soon as the metal is quiet. Fast, smooth pouring into enlarged runners as compared to those used for red brass, is desirable. Risers two to three times the weight of those used for red brass, and located so that they fill with the hottest metal, should be used.

Molds follow the usual bronze foundry precautions of an open-grained permeable sand or a well ventliated fine sand with low moisture content. Avoid organic binders to reduce volume of mold gases. Typical green sand properties are: Grain size 70-90, permeability 40-60, moisture 5.5 per cent, green shear 2.0 psi, green compression 5.0 psi.

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Plaster Mold Castings—The development[2], on a volume production basis, of casting nickel-silvers into plaster molds, has led to the achievement of smooth surface finishes at low cost. Fig. 3 shows typical commercial castings made by the plaster mold method. Finishing and polishing costs have been sharply reduced, thus leading these alloys toward broader fields of application. In some cases, castings are smooth enough to be used without being ground and polished. The 15 per cent nickel alloy described in Table III has been extensively used in the plaster mold process.

Special Compositions—The practice of combining high-nickel-content material with 60-40 yellow brass, to yield alloys finishing in the range of 60 per cent copper, 20 per cent nickel and 20 per cent zinc, is illustrated in Composition 2 of Table II. The opportunity to modify the color of these alloys from a silvery white with more than 20 per cent nickel, into the pale straw colors containing 10 per cent nickel or less, provides manufacturers with a variety of color blends which are effectively used in color schemes for architectural work, hardware and ornamental products. The 10-A and 10-B compositions listed in Table I are in this family, and lower nickel-alloyed types are made to complete the color trend back to the straw-yellow shades.

These special varieties of nickel-alloyed brass base compositions are known in the trade both as nickel-silvers and nickel-brasses. The designation is confusing where the purchaser is endeavoring to procure a product possessing a specific color. The problem is met in part by defining the product as a nickel-silver of specific nickel content which establishes a relationship between nickel content and color. In a great many cases where the common silvery-white color is desired, it has become the practice to specify a 20 per cent nickel, nickel-silver product.

There are additional modifications of the brass base of the 60-40 type which resemble the manganese bronzes because they develop high strength when cast or forged. Because of a zinc content of approximately 40 per cent and the absence of tin, they are frequently called nickel-brasses. Their lower melting points make them suitable for special casting processes.

An example in the 60 per cent copper, 40 per cent zinc family is a typical sand cast manganese bronze containing 15 per cent nickel which develops strengths up to 85,000 psi with 20 per cent elongation. In addi-

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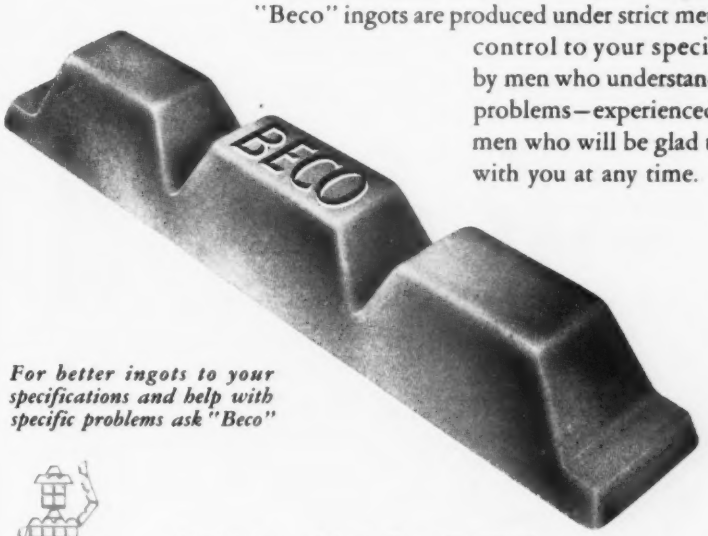

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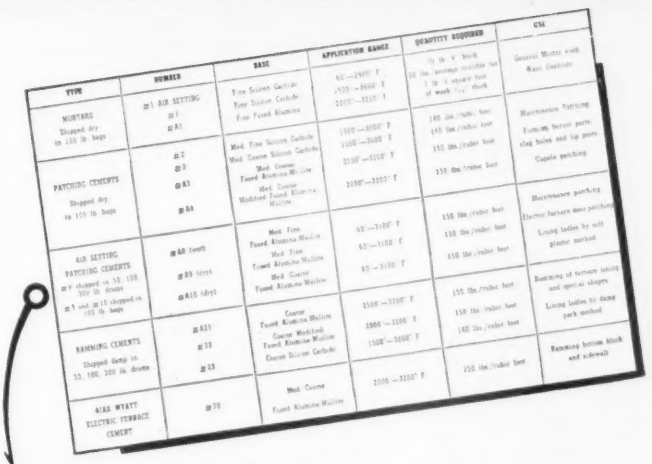

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tion, it will develop a color approaching that of nickel-silver. Its casting habits are those of manganese bronze because of the manganese bronze ingredients which produce its high strength. Another sand-cast composition proposed for propellers contains 12 to 15 per cent nickel, with manganese bronze ingredients comprising the remainder of its composition.

The die cast or forged nickel-silvers represent another member of the family of special high-strength alloys. These are compositions containing equal parts of copper and zinc, alloyed with approximately 6, 10 and 15 per cent nickel, respectively. A typical alloy will contain 45 per cent copper, 45 per cent zinc, and 10 per cent nickel. This material, procurable in extruded or hot worked forms, possesses a silvery color and develops a high strength. When in die cast form, the manufactured parts acquire a finish that hardly needs polishing or buffing. The presence of about 40 per cent zinc in these alloys provides them with enough of the hot-workable beta phase to fit them for die or pressure cast parts. Typical composition and properties of the Mueller Brass Co.'s alloy known as Niag follow: Ni 10 per cent, Cu 46 per cent, Pb 2.50 per cent, Mn 0.25 per cent, others 0.75 per cent, Zn balance; tensile strength 70,000 psi, yield strength 42,000 psi, elongation 30 per cent, bhn 120.

An ivory-white color, combined with high strength, hardness and resistance to corrosion and wear, makes Niag suitable for auto or refrigerator hardware, faucets, valve handles and bathroom fixtures. Abrasive polishes cannot remove the built-in luster. The color is retained after repeated polishing, and the chafing resulting from usage generally brightens the color and finish. The wear and corrosion resistance have made it useful for chlorine gas cylinder valves (Fig. 4). The valve threads outlast other materials in the wear attending the frequent removal for refilling of the chlorine cylinders.

The Titan Metal Mfg. Co. makes a number of forged or die formed alloys, among which the beta nickel silvers are included. Typical compositions and properties as catalogued are shown in Table IV.

The high-strength, color, polish and corrosion resistance of these alloys makes them desirable for meat hooks, ice-cream ladles, automobile accessories, and hardware for buildings, boats, autos and refrigerators. Valves, plumbing goods and bathroom fixtures, along with ornamental goods, add to the applications these alloys

fill in the office, home and store. Fig. 5 shows a small assortment.

The corrosion resistance is comparatively good. Corrosion in slow-moving sea water occurs at a rate of less than .002-in. per year (.9 Mdd). The presence of a small amount of iron in the composition is helpful. Corrosion in sea water, flowing at a rate of 2 fps for 15 months, is 8 to 10 Mdd (mg/sq dm/day). Somewhat similar results were developed for exposures at higher velocities of 7.2 and 9.8 fps. At high velocities, in aspirator-type jet tests of 12 fps for 40 days the 10 per cent nickel alloy showed corrosion of 8.5 Mdd, compared with 13.5 Mdd for Admiralty brass (70 copper—30 zinc) alloy.

Applications—

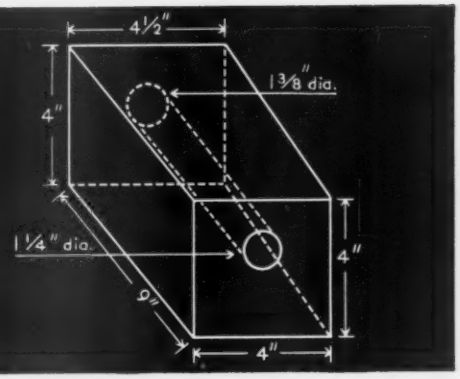
Ornamental: Nickel silver is the glamour metal of the nonferrous foundry. Cast into intricate and thin shapes, it provides beauty as well as workability from the standpoint of bending, welding, brazing or soldering. It can be cast into candlesticks, book-ends, statuary, plaques, and typical small castings.

Architecture: Ornamental grills, stairway bannisters, chandeliers, balustrades, window grills, doors and railings represent additional expressions of architectural artistry cast into a metal of beauty and permanence. Hotels, built a generation ago, retain permanently the majestic beauty of their nickel-silver work. The Waldorf-Astoria in New York, Haddon Hall in Atlantic City, Statler in Boston, Netherland Plaza in Cincinnati, Schroeder in Milwaukee and many more which were built with artistic metal interiors, read like a social register of the finest in hostelries. Over 125 tons of ornamental nickel-silver castings went into Cincinnati's Netherland Plaza, (Fig. 1), and its beauty today shows no sign of fading. Many of these buildings contain bathroom, washbowl and similar plumbing fixtures made in nickel-silver—clean, white, durable and highly resistant to corrosion from tap water. An indestructible surface finish is provided which is easily cleaned with a soap and water scour.

Public Buildings: Institutions, hospitals and government establishments frequently employ nickel-silver plumbing fixtures and hardware for hinges, locks, door handles and many similar essentials as well as ornamental purposes. Household refrigerator hinges and handles are examples of decorative hardware subject to heavy usage.

Railroad: The artistry of the architect carries over into the nickel-silver trim employed for railroad passenger and dining car hardware (Figs. 6-7), as well as for fixtures. Many

How to eliminate slag hole failures



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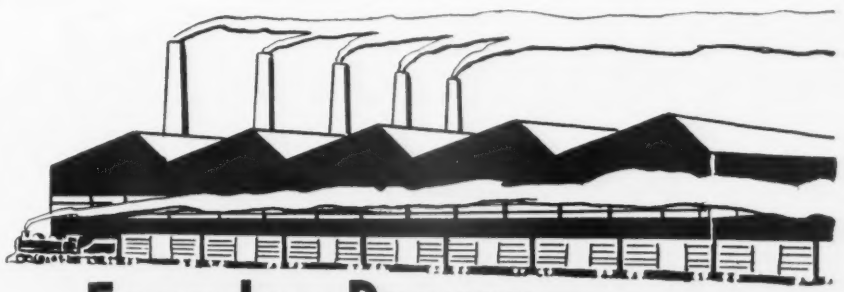

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years of rugged service are expected and delivered. Hundreds of pounds of castings per car may be used to add a refined, pleasant luster to passenger car luxury.

Marine: Hardware, plumbing, art work and shipboard trim represent another outlet for large quantities of nickel-silver castings. Marine fittings, particularly deck fittings, represent a current and important application. Sea-water corrosion resistance becomes a factor, and the high order of advantage which the nickel silvers offer make them second only to the zinc-free cupro-nickels, among copper-base alloys, for this type of service.

Household: The pleasing tone of nickel silver castings produces a harmonious match with all kinds of colors used in the decorative arts. The applications for hardware and sanitary ware of buildings and boats are repeated in the household as faucets for sinks and washbowls, flush valves, and plumbing fixtures. In some cases these parts may be bright-plated to produce a high shine, which, if worn down through heavy usage, still retains a white metal underbody.

Many nickel-silver applications are built upon the substantial mechanical properties which this decorative "white metal" provides. Automobile hardware offers an example of this, and the railroad car and refrigerator fittings are others. Meat hooks for meat packing plants represent an outlet for die cast parts, requiring high strength as well as cleanliness and durability.

The manually operated wheels and levers of machine shop and factory equipment are frequently made of nickel silver to provide that "love to touch" incentive. Laundry machine parts, dish washers, soda fountain fittings, beverage dispensers, etc. swell the total of small-casting uses for nickel silver.

Food Handling: By far the greatest tonnage of nickel-silver castings finds its way regularly into food handling equipment where the white color, durability and strength, supplement the inherent corrosion resistance to supply bright and easily cleaned surfaces. The colors should be in an alluring silvery white, easy to admire, inviting to touch, and attractive enough to eat from.

Packaging, bottling, food packing and similar machinery, along with its accessories, such as conveyor systems, weighing machines, etc. are commonly made in nickel silver. These castings stimulate the incentive to produce a shiny, germ-repelling cleanliness to the mechanisms. The attractiveness of the metal develops a desire to retain the inherent beauty of the castings which inspires the wish to keep them clean.

Tests[3] in pasteurized milk showed that nickel-silver alloys of the 11-B type, with low percentages of lead, tin and zinc, provided sufficient resistance to contamination from copper to protect the flavor of milk. Valves, fittings and similar parts, cast of this alloy, become eligible in dairy equipment.

An extensive literature on the nickel silver-alloys has been built up over the past two generations. Publications of the Mond Nickel Co. Ltd. and the International Nickel Co. Inc. provide text upon metallurgical procedures. Mechanical properties and physical metallurgy have been dealt with from a fundamental point of view in a comprehensive paper by Kihlgren, Pilling and Wise[4]. These metallurgical discussions need to be supplemented by the foundryman's skill and craftsmanship to emerge in the reality of nickel-silver castings.

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1. International Nickel Co. Inc. bulletin 402 "Foundry Practice for Nickel Silver"; also "Recommended Practices for the Sand Casting of Nonferrous Alloys," American Foundrymen's Society, 1944.
2. Wilkins, W. G., "Plaster Mold Castings," *Machine Design*, June 1949, Vol. 21, No. 6, pp. 114-118.
3. Henderson & Roadhouse, "The Influence of 'White Metal' Copper-Nickel Alloys on the Flavor of Milk," *Journal of Dairy Science*, 1940, Vol. 23, p. 215.
4. Kihlgren, T. E., Pilling, N. B. and Wise, E. M., "Physical and Casting Properties of the Nickel Silvers," *Transactions*, AIME, Vol. 117, 1935, pp. 279-312.

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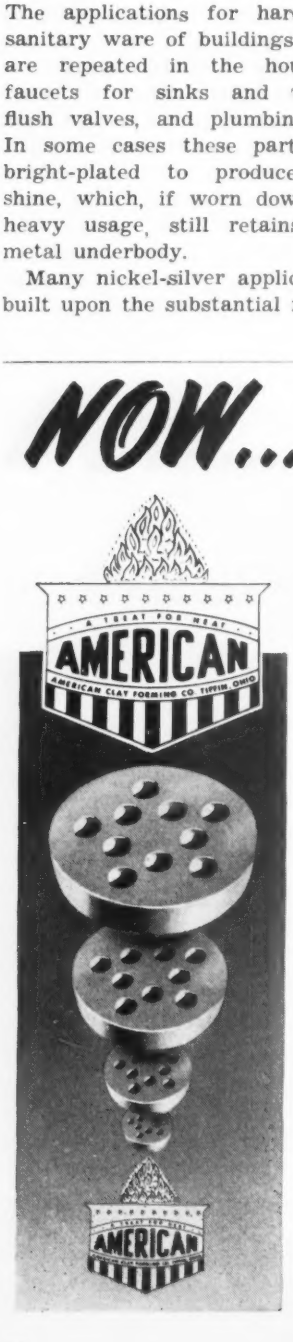

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French Foundry Benefits From U.S. Study

Jacques Berlancourt, French foundry manager, in this counry recently to study gray iron foundry methods under Economic Co-operation Administration sponsorship, returned to Beaucort, France, to put the foundry division of Japy Freres enterprises on a profitable operating basis.

Previously the foundry was losing about $5700 a month; now it is showing a $2850 monthly profit. Man hours required to produce a ton of castings have been reduced from 22 in November, 1949, to 83 in February 1951. Basic factors in the productivity drive are installation of new machines and a piece-rate system of remuneration. Wages have been increased 25 per cent, raw material costs have risen 10-15 per cent, and other costs are up but the greater production has made possible holding production costs at the 1948 level

Three Men Earn Award of Die Casting Institute

During its annual meeting at the Edgewater Beach hotel, Chicago, the American Die Casting Institute presented the Doehler award to three men for "outstanding achievement contributing to the advancement of the die casting industry."

Recipients were: Charles A. Sanford, Cleveland Hardware & Forging Co.; Norman Dress, Precision Castings Inc., and Byron S. Van Horn, Doehler-Jarvis Corp. These men were responsible for the compilation and publication of the "Die Casting Industry Safety Manual." The award included certificates and cash awards of $500 to each winner.

Book Review

Principles and Methods of Sheet-Metal Fabricating by George Sachs, cloth, 526 pages, 6 x 9 inches, published by Reinhold Publishing Corp., New York. Price $10.

In general literature pertaining to sheet-metal working has been concerned with tool development for individual jobs with little effort to analyze the principles of forming operations. However, over the past 25 years considerable research has been devoted to certain metal forming problems, and more particularly during World War II. Since little of that information has been made available, the author, who directed a number of these investigations, has based this book to a considerable extent on the results obtained. He endeavors to describe systematically the principles of numerous sheet-metal forming methods, and to emphasize their similarities and differences.

The book is divided into five main classifications relating to sheet metal and sheet-metal parts; principles of forming various part types; principles of deep drawing; press-die forming of sheet-metal parts, and various sheet metal forming methods. Each classification is composed of five chapters.

ASTM Yearbook Out

American Society for Testing Materials, 1916 Race St., Philadelphia 3, just has made available its *ASTM Year Book* as of September, 1951. Containing 604 pages, 6 x 9 in., it contains names of its members listed alphabetically as well as geographically. It also contains information on the society's various technical committees, giving scope, personnel, and subcommittees. Information and data relating to the society and its activities also are included.

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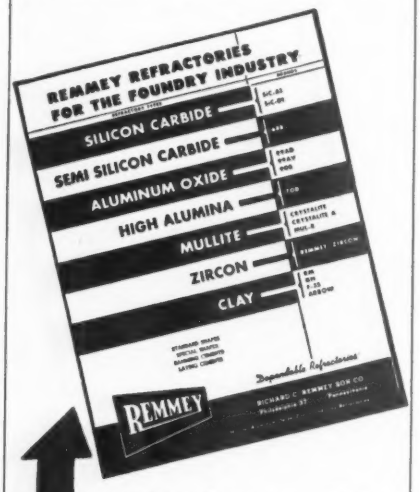

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. . . TRADE PUBLICATIONS . . .

For More Details on these Items Use Reply Card—Page 223

CUPOLA OPERATION: Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.—Bulletin FO-1 on "How To Make Your Cupola Operation More Efficient" suggests what to do about present day raw materials, lighting the bed, blast control, refractories, tuyeres, charging, carbon control hot blast, moisture control, and duplexing.
For More Details Circle No. 90—Page 223

IMPREGNANT: Archer-Daniels-Midland Co., Foundry Products Division, 2191 West 110 St., Cleveland 2—Bulletin 501 describes an impregnant for magnesium alloy, aluminum bronze and other nonferrous castings. Information on equipment and complete procedure for impregnating is included.
For More Details Circle No. 91—Page 223

BLOCK INSULATION: Johns-Manville, 22 East 40th St., New York 16—Folder lists advantages and properties of high-temperature block insulation. Included are conductivity and heat loss graphs and a recommended thickness table. Special shapes are pictured.
For More Details Circle No. 92—Page 223

VIBRATING FEEDERS: Jeffrey Mfg. Co., 907 North Fourth St., Columbus 16, O.—Catalog 830 describes the principle of operation of electric vibrating feeders and conveyors. Specifications and descripitive literature cover feeders, conveyors and related equipment.
For More Details Circle No. 93—Page 223

INSULATION: Refractory & Insulation Corp., 120 Wall St., New York 5—Catalog shows where, when and how to use refractory and insulating materials of various types in industrial heat processing and heat generating equipment of all kinds.
For More Details Circle No. 94—Page 223

AIR TOOLS: Rotor Tool Co., 17325 Euclid Ave., Cleveland 12—Catalog 38 describes complete line of air grinders, drills, rammers, scalers, shippers, sanders, buffers and wire brush tools with application photos and specifications.
For More Details Circle No. 95—Page 223

LIFT TRUCK: Lull Mfg. Co., 3612 East 44th St., Minneapolis 6—Unusual 5-ton hauling truck has hydraulically operated forks mounted at the side for lifting, loading and stacking material. Bulletin describes its operation and features.
For More Details Circle No. 96—Page 223

CENTRIFUGAL CASTING: Shenango-Penn Mold Co., Dover, O.—Two bulletins show machine parts and assemblies regularly produced by centrifugal casting. Bulletin 150 covers parts of nonferrous metals including bronzes, monel, nickel, aluminum, and special alloys. Bulletin 151 similarly features parts of Meehanite, Ni-Resist, and special iron alloys.
For More Details Circle No. 97—Page 223

GRINDERS: Poly Products, Pasadena 8, Calif.—Catalog contains information on company's line of ball bearing bench grinders, arbors, sanding disks and face plates. Included are specifications, dimensional diagrams and application suggestions.
For More Details Circle No. 98—Page 223

BRINELL SCALE: Steel City Testing Machine Inc., 8843 Livernois, Detroit 4—Pockt-size table of brinell hardness numbers incorporates other tabular information of importance to the metallurgist, inspector and engineer.
For More Details Circle No. 99—Page 223

REFRACTORIES: Carborundum Co., Refractories Division, Perth Amboy, N. J.—Booklet tells what super refractories are and discusses their use under various conditions which prevail in practice.
For More Details Circle No. 100—Page 223

CORE OIL: United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.—Binders contain data sheets on core oil qualities and test results of oil-sand mixtures. Typical mixes used by various foundries are listed.
For More Details Circle No. 101—Page 223

ELECTRIC POWER: General Electric Co., Schenectady 5, N. Y.—Bulletin GEA-5600 outlines methods of obtaining electric power equipment for quick expansion at low cost and with a minimum of critical materials.
For More Details Circle No. 102—Page 223

TOOL CONTROL: Management Controls Division, Remington Rand Inc., 315 Fourth Ave., New York 10—Pamphlet KD 641 describes a three-way control system for tools, jigs, and dies.
For More Details Circle No. 103—Page 223

DISPATCH SYSTEMS: American Monorail Co., 13107 Athens Ave., Cleveland 7—Bulletin AD-1 describes and diagrams automatic monorail dispatch system for delivering materials to single or multiple stations.
For More Details Circle No. 104—Page 223

CONVEYORS: Stephens-Adamson Mfg. Co., 100 Ridgeway Ave., Aurora, Ill.—Vol. 196 of the company's house organ describes and pictures installations of conveyor equipment in a number of different industries.
For More Details Circle No. 105—Page 223

TRUCKS: Towmotor Corp., 1226 East 152nd St., Cleveland 10—Folder describes features and accessories of the company's fork lift trucks and tractors.
For More Details Circle No. 106—Page 223

Every Top Management Man... In Every Industry

SHOULD BE ABLE TO ANSWER THESE QUESTIONS ABOUT A MOST CRITICAL EMERGENCY IN OUR COUNTRY'S AFFAIRS

Q. Why is iron and steel *scrap* a matter of importance to me?

A. Steel for our country's military program and civilian economy is being produced at the annual rate of 107,000,000 tons in 1951 . . . 119,500,000 tons expected in 1952. Steel-making capacity is being increased now to meet those quotas.

What Do I Get For My Scrap?

In addition to being paid for your scrap, you remove nuisance inventory from your plant—saving valuable floor space. Also, you have a better chance of *getting* new steel or steel products. But, *most important*—you help alleviate a dangerous condition threatening our country's capacity to rearm and satisfy civilian requirements at the same time.

Q. How does scrap figure in the production of steel?

A. Steel is composed, generally speaking, 50% of pig iron, 25% of "production" scrap (that is, the scrap which is produced as a by-product of steel-making) and 25% of "purchased" scrap.

Q. Is scrap getting scarce?

A. Yes. The supply of *purchased* scrap is not increasing fast enough to meet the needs of increasing steel production.

Q. What if the needed scrap isn't obtained?

A. Open-hearth furnaces will not be able to operate at capacity. That will mean a loss of steel production . . . and fewer products made of steel.

Q. Why not use pig iron instead of scrap?

A. Every ton of scrap conserves approximately 2 tons of iron ore, 1 ton of coal, nearly ½ ton of limestone and many other vital natural resources—to say nothing of the extra transportation facilities that would be otherwise required.

Q. How can *more* scrap be furnished?

A. By everybody pitching in—as we always do in every emergency—and searching out all possible sources of scrap.

Q. What are these sources?

A. Metal-fabricating plants normally turn over to scrap dealers the scrap left from machining. But there's not enough of this to fill our present enormous need. So everybody—both in and out of the metal-fabricating industries—must sell scrap in the form of *idle metal.*

Every pound of idle metal is needed to keep our steel mills operating at top capacity. Sell your idle metal to a local scrap dealer right away.

What Do I Do *First*?

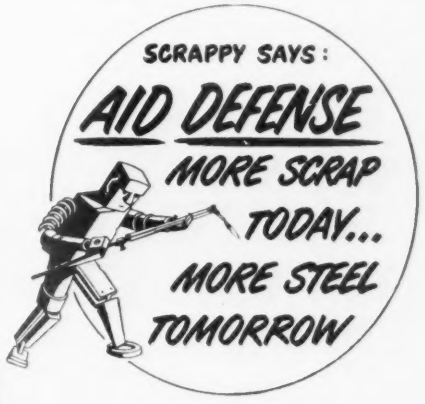
Write for free booklet. It tells how to set up a Scrap Salvage Program in your plant. Thousands of plants are cooperating. Do your part now! Address Advertising Council, 25 West 45th Street, New York 19, N. Y.

Q. *We* don't *produce* scrap—how can *we* help?

A. Scrap is any kind of iron and steel that's gathering dust—obsolete machines or structures, jigs and fixtures, pulleys and wheels, chains and track, valves and pipe—*anything* with rust on it or dust on it. Non-ferrous scrap is needed, too.

Q. What do we do with it when we find it?

A. Use your normal channels or get in touch with a recognized scrap dealer.



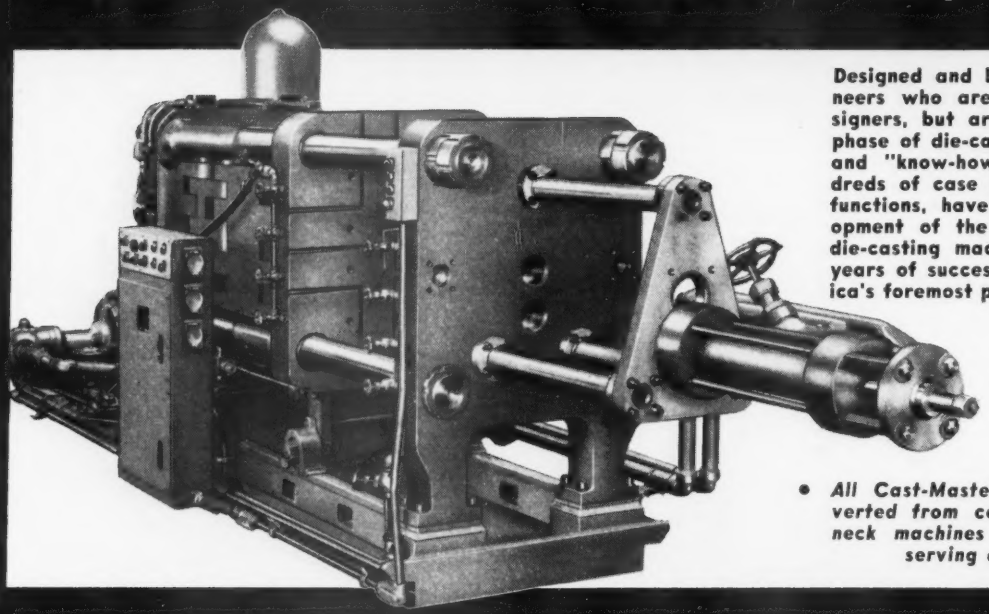
This advertisement is a contribution, in the national interest, by

FOUNDRY

A PUBLIC SERVICE PROJECT
THE ADVERTISING COUNCIL

CAST-MASTER *Die Casting Machines*

★ Rugged All-Steel Construction ★ New Hydraulic System Minimizes Fire Hazards ★ Easy to Operate



Designed and built by top-notch engineers who are not only machine designers, but are well versed in every phase of die-casting. Their knowledge and "know-how" combined with hundreds of case histories on die-casting functions, have resulted in the development of the CAST-MASTER . . . a die-casting machine with a record of years of successful operation in America's foremost plants.

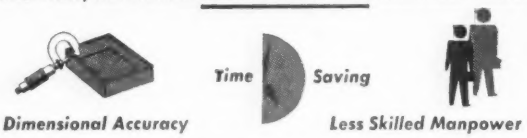
Write For Complete Specifications!

- *All Cast-Master models can be converted from cold chamber to gooseneck machines and vice versa—thus serving a dual purpose.*

Manufactured by MILLER-TAYLOR TOOL CO. Cleveland 3, Ohio, U.S.A.

"8000" TOOL-PLASTIC

THE NEW, IMPROVED *NON-SHRINK* CASTING RESIN



Dimensional Accuracy — *Less Skilled Manpower*

For Master Molds—Foundry Patterns —Duplicating Patterns—Form Dies— Check Fixtures

A material of interest to the engineer who

1. Desires to produce models or tools quickly and economically—
2. With a minimum of highly skilled labor—
3. Without elaborate or expensive equipment.

IMPORTANT NOTICE

Rezolin "8000" Tool-Plastic can now be hardened without heat in a matter of hours by the use of the new and exclusive Rezolin Quick-Set* Accelerator additive (liquid type).

Write today for new catalog F-11

(*Pat. App. For)

Rezolin, inc.

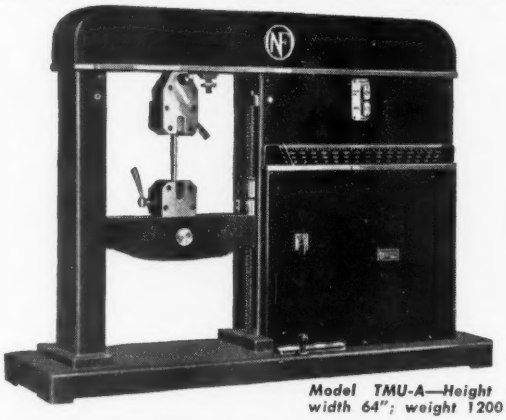
Serving Industry Since 1938

4825-27 W. Jefferson Blvd., Los Angeles 16, Calif.

It Will Pay to Make Your Own Tests with

NATIONAL FORGE

UNIVERSAL TESTING UNITS



Model TMU-A—Height 44"; width 64"; weight 1200 lbs.

The National Forge Universal Testing Machines, are compact, accurate, dependable, easy to operate and moderately-priced.

Wide working clearances, long stroke, quick-action simplified variable-speed control, improved grips and a wide spread of load scale ranges adapt this modern, streamlined unit to production, research or school instruction tests of a great variety of materials and specimen sizes. A.S.T.M. accuracy requirements are guaranteed.

Three load scale ranges: Model TMU-A—0-30,000, 0-6000, 0-600 lbs. Model TMU-B—0-15,000, 0-3000, 0-300 lbs.

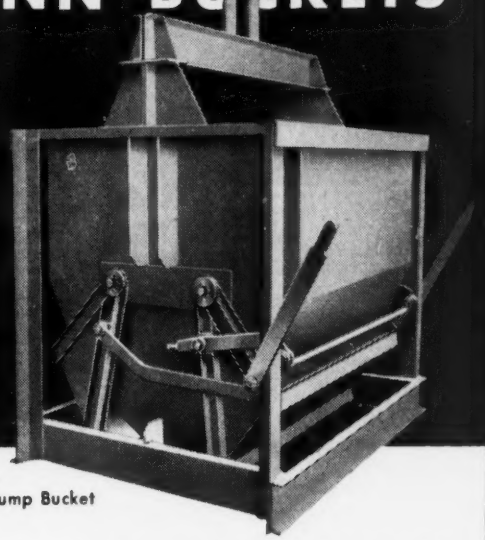
Prompt deliveries of few units remaining in stock. For details, write for Brochure 501.

TESTING MACHINE DIVISION

NATIONAL FORGE & ORDNANCE COMPANY

Dept. F, Irvine, Warren County, Penna.

PENN BUCKETS



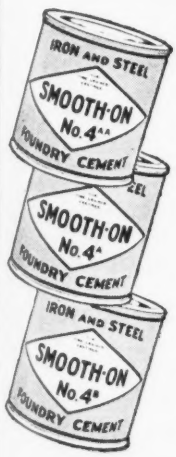
No. 30-A
Bottom Dump Bucket

Exclusive design makes this bottom dump bucket easy to operate . . . easy to open. Efficient for foundry use in handling all types of sand, moulding or core, dry or prepared. Can be used with coke, scrap iron and castings also. Sizes 7 to 200 cu. ft.

Write Today for Catalog • Prices Quoted on Application

PENN IRON WORKS, INC.
READING, PENNA.

LIGHT — MEDIUM — DARK
. . . a shade to match every iron or steel casting



Because different cast metals vary in shade and texture, Smooth-On No. 4 Foundry Cement is supplied in three shades, to match light, medium and dark gray metals. This enables you to make repairs that are almost invisible when you true up small holes, pock-marks, depressions. For light gray, finer textured metal you use Smooth-On No. 4AA, which may be filed and machined. Medium gray castings call for No. 4A. Dark gray castings of coarser texture are matched with Smooth-On No. 4B. If your supply house hasn't Smooth-On Foundry Cements, write us.

FREE Samples and Handbook

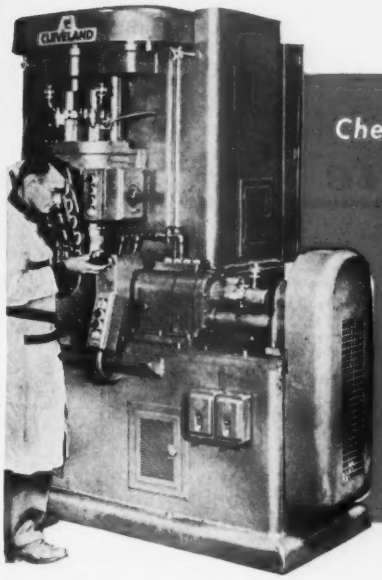
Try Smooth-On No. 4 at our expense. Write for free sample in the shade you'd like to try. We'll send also the 40-page Smooth-On Handbook describing other Smooth-On Cements and their time-and-money-saving uses. Write TODAY.

SMOOTH-ON MFG. CO., Dept. 17
570 Communipaw Ave., Jersey City 4, N. J.

Do it with **SMOOTH-ON**
FOUNDRY CEMENT

CLEVELAND tapping machines *lead screw*

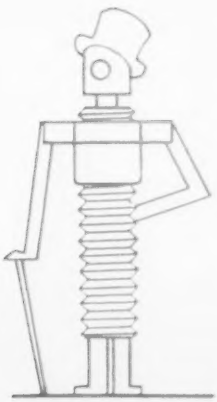
Step up Production to Maximum Cut Operating Costs to Minimum



Check These Features...

Precision hardened and ground lead screw • Heat treated alloy steel spindles for maximum strength • Shear pin protection Positive coolant and lubricant supply under constant control of operator • Rigidly constructed to give years of service • Maximum safety for operator and machine.

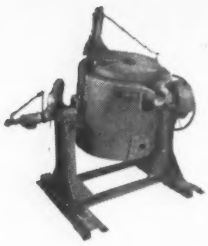
Designed by CLEVELAND engineers after many conferences with leading firms in the pipe and conduit fittings industries, the new Series F machine is making production records. Three models . . . F-1, F-2, and FT-1 . . . are available. The F-1 and F-2 are fully automatic in operation, fed from a magazine type hopper, and do two 90°ells, street ells or reducer ells at each stroke of the machine . . . threading and chamfering simultaneously from the cored hole. The FT-1 will tap and chamfer complete two tees at each stroke of the machine. Fast accurate and sturdy . . . trouble free, producing parts which are square and within the required tolerance . . . these modern machines will step up production to maximum and cut down to a minimum your labor costs. Write for Catalog F-3.

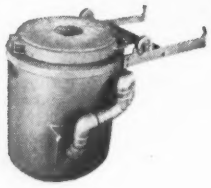


Meet Mr. Lead Screw . . .

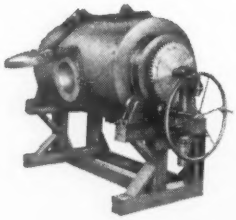
of The Cleveland Tapping Machine Co. Mr. Lead Screw symbolizes the time-proved lead screw feed designed and pioneered by Cleveland . . . now generally accepted as the key to precision tapping at high speeds. Write for your copy of the Cleveland Production Tapping Guide and a copy of Catalog.

THE CLEVELAND TAPPING MACHINE CO.
A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.
CANTON 6, OHIO

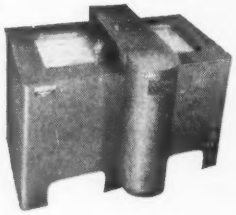




a complete line

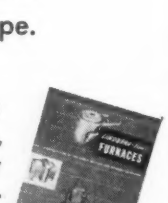


for your specific need



There's a specific Lindberg-Fisher furnace to exactly fit your precise melting and holding need. Whether it's gas—oil—electric—induction—arc—or high frequency—it's included in the complete Lindberg-Fisher furnace line. That's why our engineers can intelligently and without prejudice recommend the furnace to best fit your needs—regardless of type.

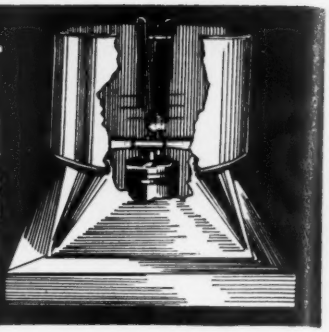
SEND TODAY FOR BULLETIN 551
Twelve illustrated pages giving sizes, capacities, construction details and primary applications of the complete line.



LINDBERG-Fisher

A division of Lindberg Engineering Co.
2453 W. Hubbard Street Chicago 12, Illinois

DON'T LET FOUL AIR FOUL UP YOUR PRODUCTION



Automatic Roof Ventilator
Propeller Pitch Adjustable
Balanced Damper Flaps

Eliminating foul air is our JOB. Industrial Air manufactures fans and ventilating equipment to fit your specifications and JOB needs. Available in all sizes, from 14" through 72" in diameter, belt or direct driven operation.

Duct Fans
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● QUALITY AND OPEN HEAD DESIGN PROVIDE THE MOST DEPENDABLE CORE-HOLDING POWER.

We also make
MOTOR CHAPLETS,
BOILER CHAPLETS,
FORGED HEAD CHAPLETS,
FITTED HEAD CHAPLETS,
DOUBLE HEAD CHAPLETS
and other types.

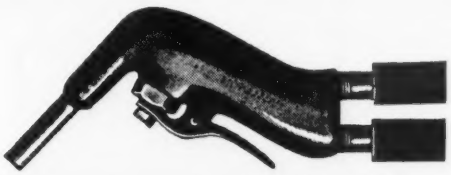
This Patented Open Head Design is an exclusive feature enabling you to pack sand sounder under the head and around the stem of chaplet so that cores have better support.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd., Euclid, Ohio

CLEVELAND Chaplets
Since 1890

THIS IS THE GIMMICK THAT ELIMINATED SWABS, BRUSHES AND SPRAY CANS FROM HUNDREDS OF FOUNDRIES. IT IS THE MURPHY PISTOL SPRAYER

Over a million sold to date. Is the most compactly and scientifically designed ejector ever made for blackening purposes. It is invaluable for the cleaning of permanent molds for aluminum and other metals by sand blasting. Indispensable in up-to-date shops. Designed by a practical foundryman. Well made and guaranteed.



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PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Used for Silica wash, oil, water or any liquid material. For sand-blast cleaning. As a blow gun for cleaning motors and machinery. If your dealer cannot supply you at once, order direct from manufacturer below. Literature on request.

HAMILTON SPRAY GUN

Complete with 4½ ft. suction hose and sinker . . . **$10.00 F.O.B.** Hamilton, O. *For spraying molds and cores with any liquid. For cleaning motors and machinery. For laying dust. Trigger control. Well made and guaranteed.*

GUARANTEED COMPRESSED AIR PRODUCTS

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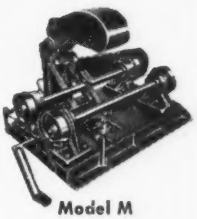
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

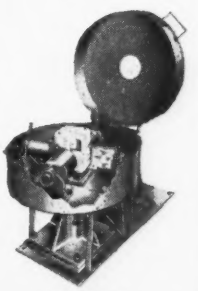
CENTRIFUGAL CASTING MACHINES

Model AS

Model J



Model M



Model J-P

These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.

They are made in a large variety of styles and a wide range of sizes. Complete technical information is supplied concerning sand and permanent mold design, gating, sand mixes, speeds, etc.

Send us drawings or sketches of parts you are interested in casting centrifugally, and we will tell you, without obligation, if and how our machines can cast them faster, cleaner and with fewer rejects.

CENTRIFUGAL CASTING MACHINE COMPANY
Nathan Janco, *President*
P. O. Box 947 Tulsa 1, Okla.

Reduce Use of Chills in Gray Iron Casting

Now all you have to do to get hard chilled iron is add

TELLURIUM

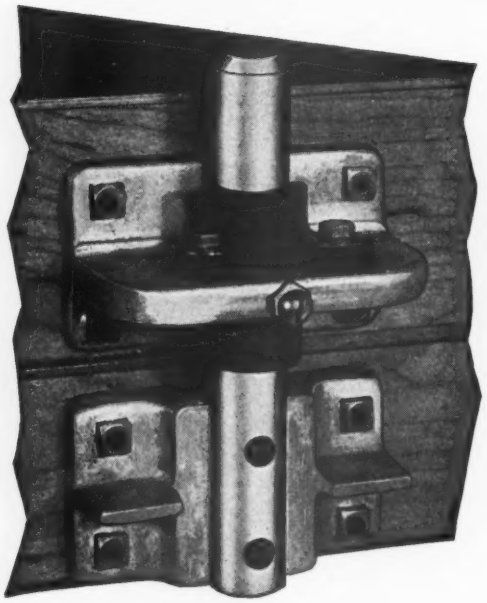
Comes in 1, 2, 3, and 4-gram tablets; also in powder, slabs and sticks. For full information, write Dept. LM for 16-page article on the use of TELLURIUM in chill control.

American Smelting and Refining Company
120 BROADWAY • NEW YORK 5, N.Y.

V-G CHERRY SNAP FLASKS

Featuring the

V-G ROUND PIN ASSEMBLY



ONE INCH ROUND STEEL PIN
HARDENED and RUSTPROOF
DOUBLE LIFE—REVERSIBLE

REMOVE CAP SCREWS AND ROTATE PIN 180 DEGREES.

ALUMINUM PIN BASE AND COPE EAR ADJUSTING SCREW FOR COPE GUIDE

V-G Flasks are seasoned cherry with new hook-type latches that never loosen. Adjustable hinges are screwed AND bolted to the flask. Wear strips of either steel or HARDENED-24ST- Aluminum are available. Other standard pins also available.

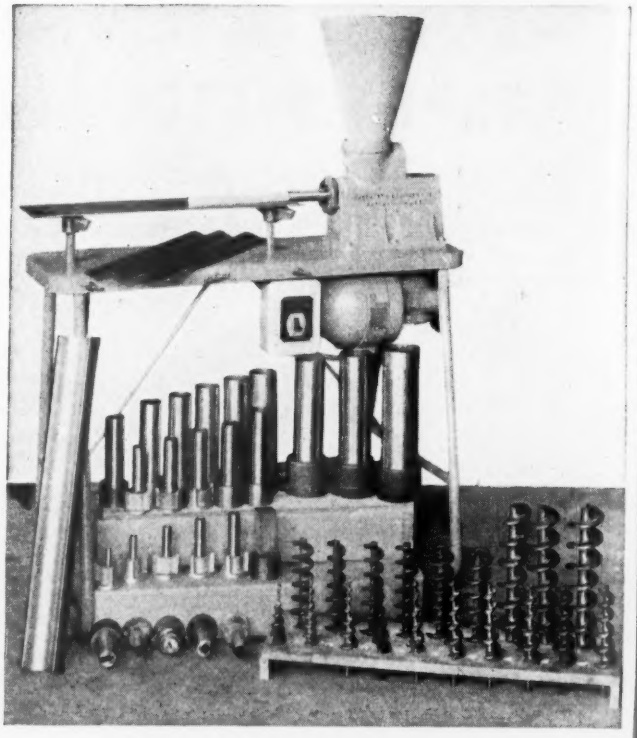
Shipments can be made promptly

Write for complete information

Correspondence invited from Distributors

V-G FLASK & FITTING CO.
MADISON, CONNECTICUT

STOCK CORE EXTRUDERS



Wadsworth #1 Capacity 3/8" to 3"

By: **WADSWORTH EQUIPMENT CO.**
555 La Follette St., Akron 1, Ohio

PHILADELPHIA COKE

PHILADELPHIA COKE COMPANY

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INDUSTRIAL COKE

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- AMASTEEL is the blast cleaning material that is engineered for the job.
- AMASTEEL assures the lowest cleaning cost.
- AMASTEEL lasts many times longer. Investigate!
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Abrasive for any and all kinds of work.

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REMOVES FUMES—DUST FASTER!

High Quality
PRESSURE BLOWER

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For the fast, efficient elimination of welding fumes, sawdust, or other air impurities, you can depend on this precision-made, all-aluminum high-pressure blower. Made with 5½" inlet and 3½" outlet. Enclosed ½ H.P. Westinghouse single phase motor, 115 V., A. C., provides 3450 R.P.M. and up to 450 C.F.M. Immediate delivery! Ask for =BL50W.

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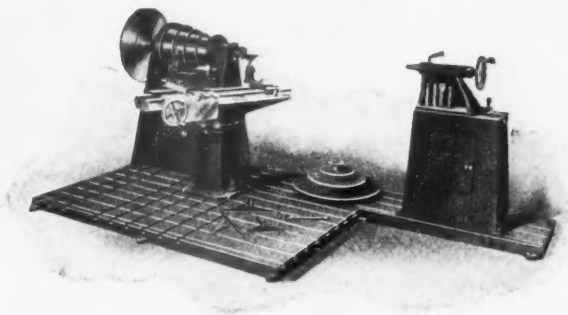
MFG. CO., INC.
WEST BERLIN, N. J.

"OLIVER" No. 21
PATTERN MAKERS' LATHE



VERSATILE AND POWERFUL

- This "Oliver" No. 21 Lathe is one of a complete line of woodturning lathes found in pattern shops of leading engineering works.

  It swings 92" diameter over sole plate, 100" over floor, and any desired diameter over pit at rear of headstock. Between centers it cuts 6'6", or lathe can be made special for greater lengths. A 5-hp. A. C. or D. C. belted-motor gives wide range of headstock speeds. Head, tail stock, carriage columns mounted on sole plate built any desired length. Write for Bulletin No. 21.

OLIVER MACHINERY COMPANY
Established 1890 **GRAND RAPIDS 2, MICH.**

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FOR NONFERROUS METALS FROM ACME SPECIAL FORMULA

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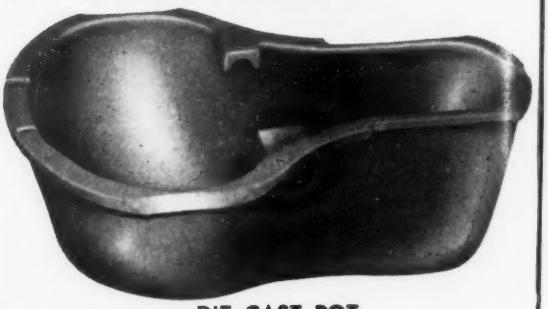
NO. 550A



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HOLDING BOWL
NO. HP7001

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SCHEDULE OF 40 SIZES

ACME FOUNDRY COMPANY

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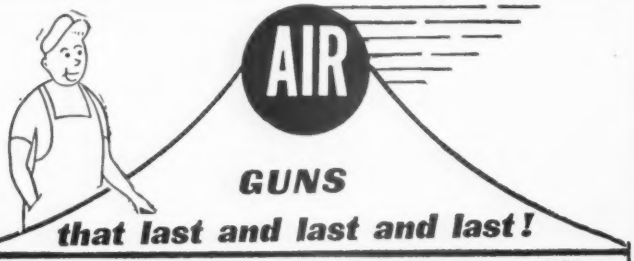

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that last and last and last!

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An invention in valve means

Ingenious lever arrangement makes conventional packing stem and gland unnessary.

Used in leading foundries and machine shops.

See your jobber or write direct for full details

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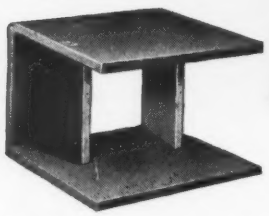
BUFFALO "Double Angle" CHAPLETS

★ Greater Strength
★ Burn in more easily
★ Less Chilling



The extra strength of this exclusive *Angle Design* (originated and patented by Combined Supply and Equipment Co.) permits the use of these Buffalo Chaplets in thinner gauges.

Direct advantages are the ability to burn in more easily and a greater resistance to chilling.

Thorough coating promotes immediate fusion with the molten metal.

Your requirements may be met with Buffalo "Angle Stem" (Single) or "Double Angle" Chaplets, in a range of four metal gauges. Complete information, samples and prices promptly furnished.

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American Shot & Grit

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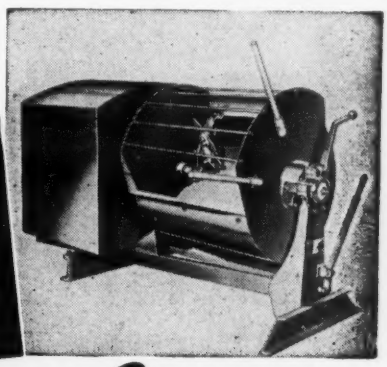
WONDER Sand MIXERS



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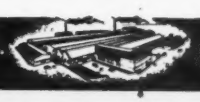

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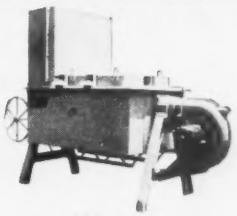
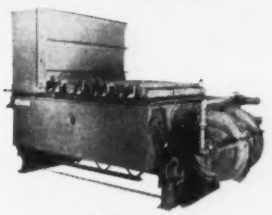


400 Series



1000 Series

Reda Stack-Loading melting furnaces for ferrous and non-ferrous metals have been designed and built by experienced foundrymen for foundrymen everywhere. That is why Reda furnaces provide advantages far beyond those found in other, and more expensive, types; that is why, with Reda furnaces there is less down time for maintenance, longer, uninterrupted melting runs, and lower melting costs.

Another feature is the Reda Burner arrangement which can operate from oil and gas simultaneously or be switched from one fuel to the other instantly.

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SERIES	IRON	BRASS	IRON	BRASS
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1000	1000#	1125#	3000#	4000#

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HAUCK OIL AND GAS BURNING EQUIPMENT

for CUPOLA LIGHTING
MOLD DRYING
LADLE HEATING
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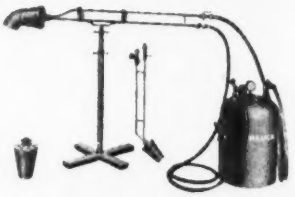
Compressed air portable oil burner equipment for lighting cupolas and drying molds. Also hand pump types.

Venturi compressed air "suction" hand torches — no preheating, for drying linings, cores, molds.

Portable venturi high pressure oil burners with adjustable burner stand for heating and drying ladles.

Featuring
3 BIG OPERATIONS WITH 1 EQUIPMENT



This Hauck All-Purpose Unit with interchangeable Burners and Nozzles, lights cupolas, heats ladles, dries molds. Fast, efficient—easy to handle. Burner flame adjustable and can be directed from any angle. Nothing like it for superior performance. Get Hauck Foundry Catalog.

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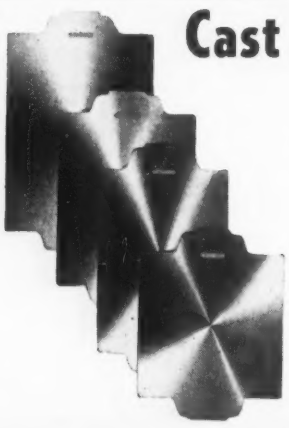

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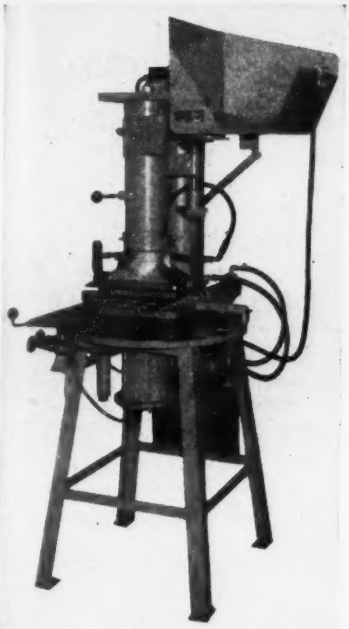

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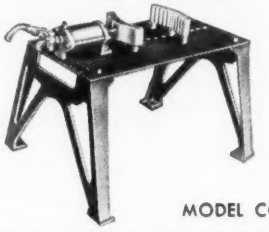

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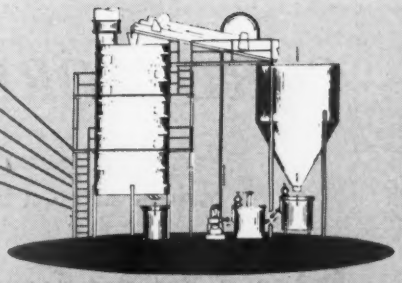

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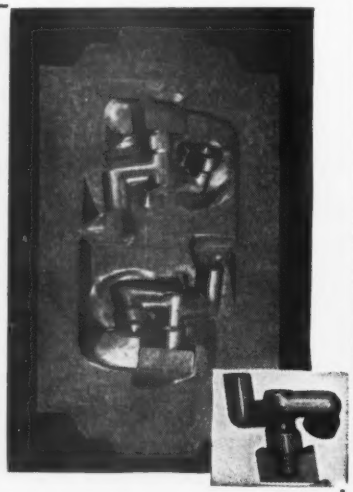

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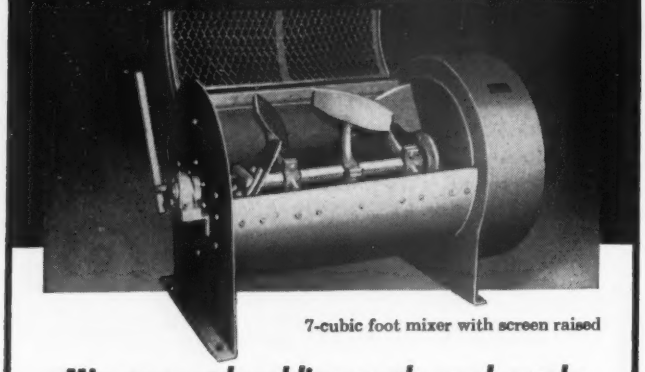

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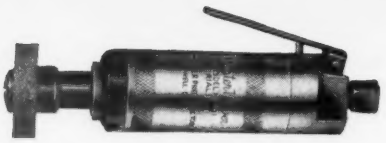

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IF YOUR PROBLEM INCLUDES

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THE MASTER PNEUMATIC TOOL COMPANY, INC.
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for Consistent Quality

Specify
"OTTAWA SILICA"

OTTAWA SAND IS 99.89% PURE SILICA

Sands for synthetic molding . . . cores . . . furnace bottoms. All grades washed, dried and screened to accurate sizes. Wide range of grain fineness.

For sandblasting, foundrymen find Flint Shot or Diamond Sandblast Sand efficient and economical.

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ANALYSIS OF CASTING DEFECTS

133 pages, illustrated
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To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.

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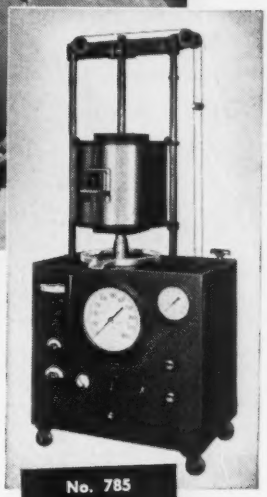
GOOD CASTINGS FROM THERMOLAB TESTED SAND

Beloit Iron Works, Beloit, Wis., make these 12 ton Dryer Shells without loss. The Sand is tested daily in the Thermolab.



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Here is a good way to be sure your important castings will come out of the sand in perfect condition.

The above 5 foot Dryer Shell appears just as it came from the shakeout, clean and free from defects.

Beloit Iron Works consider the Thermolab an essential part of their quality control program. Savings in casting finishing operations alone, paid for the Thermolab in the first six months.

High temperature sand testing and control in the Dietert Thermolabs is the key to high casting quality.

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The Dietert Co. will be glad to explain how a Thermolab can help you.

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Most approved methods of blast cleaning and ventilation are fully covered from the standpoint of modern practices. A valuable text covering the entire field and its allied equipment.

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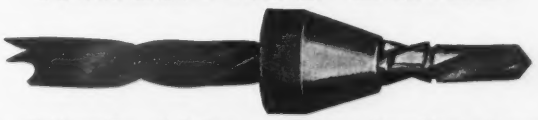

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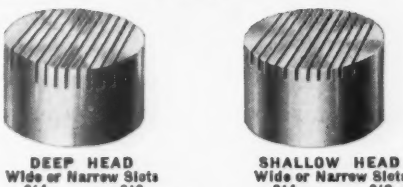

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Made of Tempered Steel, Easy to Use

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This foundry industry is a world-wide market.

Not only does FOUNDRY give you far greater coverage of the U. S. foundry market, but it gives you, as a plus value, the greatest coverage of foreign foundries.

Such world-wide influence among foundrymen gives your advertising in FOUNDRY a plus value also. Foundrymen at home and abroad look to this magazine to keep them fully informed on the news and new developments in methods, processes, equipment, etc.

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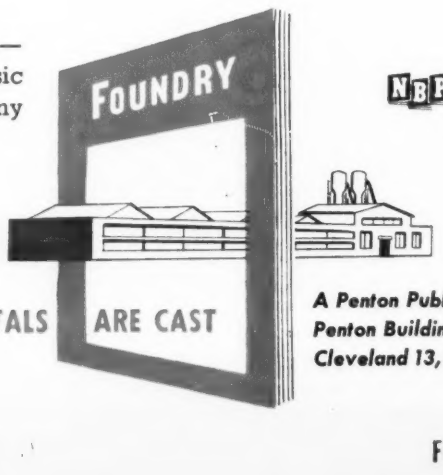
Reaching *every foundry* employing over 50 . . . and 86% of all others



Helping You Sell To Foundrymen

WHEREVER METALS

A Penton Publication
Penton Building
Cleveland 13, Ohio

CLASSIFIED ADVERTISING

Help Wanted

CLEANING ROOM FOREMAN

Experienced foreman for miscellaneous and semi-production steel foundry. Must have thorough knowledge of heat treating. Excellent opportunity for right person. Good salary, insurance and bonus. State qualifications and expected salary. Location—Detroit area. Address:

BOX 611

FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

For shop producing 500 tons carbon and alloy steel, 300 tons electric iron and 150 tons brass pressure vessel castings per month. Must have broad and extensive experience in foundry operations, proven administrative ability, and good practical and technical background. Excellent opportunity with long established company of best reputation.

Reply in confidence giving full information as to age, background and experience as well as salary requirements. Address: Box 470, FOUNDRY, Cleveland 13, Ohio.

BRONZE FOUNDRY FOREMAN

Experienced in overhead sand feed units, modern type equipment to be installed at year end. Foundry will have seven new units, rollover machines, floor and tub molders. Medium size operation, casting bronze for locomotive fittings, brass valves, marine castings, etc. Thorough knowledge required of gates and risers, patterns and core boxes. Includes supervision of core and cleaning rooms. Successful operator if possessing good knowledge of iron foundry could become superintendent of the whole foundry operation. Situated Eastern part of Canada. Good salary to right man. Welfare conditions good, pension plan, etc. Write stating age, experience, salary expected, when available. Address: Box 598, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

With a metallurgical background to supervise the entire operation of a production foundry, pouring over 100 tons of small medium size gray iron castings daily. Plant is located in Wisconsin. Excellent opportunity to succeed. If interested, provide previous work history, references, photograph and salary desired.

BRILLION IRON WORKS

BRILLION WISCONSIN

POSITION OPEN—MIDWEST

Ferrous Metallurgist or foundry engineer—Man between 25-30—needed in expanding research organization. College degree in Metallurgy or equivalent necessary. Experience not important. Write stating age, education and salary expected.

BOX 655

FOUNDRY CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

For a semi-mechanized grey iron foundry in Connecticut doing jobbing work. Supervise the entire foundry, including snagging. All molding done on squeezers. Give full particulars in first letter.

BOX 646

FOUNDRY CLEVELAND 13, OHIO

CLEANING ROOM SUPERINTENDENT

Experienced man to supervise operation of cleaning department for Eastern Pennsylvania steel foundry producing 500 tons of miscellaneous carbon and low alloy castings a month. Position available immediately. Excellent opportunity for qualified man. Good salary, insurance and bonus. State age, experience and salary requirements. All replies held confidential. Address: Box 669, FOUNDRY, Cleveland 13, Ohio.

PLANT ENGINEER

With experience in plant layout, mechanization, conveyor systems, method study and construction. Knowledge of foundry operations desirable. In replying state education, experience and salary expected. Address: Box 635, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

FOREMAN AND ENGINEER WANTED

Two different positions to be filled in Central New England Gray Iron Jobbing foundry—

ENGINEER—FOUNDRY FOREMAN

Experience essential. State age, qualifications and salary requirements.

BOX 591

FOUNDRY CLEVELAND 13, OHIO

FIELD SALES MANAGER

Splendid opportunity for seasoned supply salesman to associate himself with progressive manufacturer.

The man we want must have a successful sales record in the foundry field; a wide acquaintance among top foundry management; age 35-50. Our organization knows of this ad. All replies will be treated confidentially.

Include recent photo and give detailed information as to your qualifications. Please do not apply unless you have a personal sales record that will stand rigid investigation.

BOX 639

FOUNDRY CLEVELAND 13, OHIO

ENGINEERS—DRAFTSMEN

Experienced in foundry layout, equipment details and specifications. Prefer experience in foundry plant engineering or materials handling equipment. Write giving outline of experience and salary required.

LESTER B. KNIGHT & ASSOCIATES, INC.

600 WEST JACKSON BLVD. CHICAGO 6, ILL.

MELTING SUPERVISOR

TO SUPERVISE COMPLETE MELTING DEPARTMENT IN STEEL FOUNDRY PRODUCING BOTH ACID AND ELECTRIC AND BASIC ELECTRIC STEEL. MAN WITH METALLURGICAL DEGREE OR THE EQUIVALENT DESIRED. PLANT LOCATED IN MIDWEST. STATE FULL PARTICULARS AND SALARY DESIRED IN FIRST REPLY. ADDRESS BOX 651, FOUNDRY, CLEVELAND 13, OHIO.

MOLDING SUPERVISOR
POURING SUPERVISOR
MELTING SUPERVISOR
NIGHT SUPERINTENDENT

Due to expansion, above men needed at once. Actual steel foundry experience in above classifications necessary. Salary. Please write, call in person or phone ENdicott 1-4540.

WEST STEEL CASTING COMPANY

805 East 70th Street Cleveland 3, Ohio

FOUNDRY SUPERINTENDENT
FOUNDRY FOREMAN

Superintendent—man under 40, experienced in jobbing foundry, high grade machine tool castings, one pound to 20,000 lbs., 200 employees, small town Northeastern, Ohio.

FOREMAN—Young man, ambitious who wants responsible position in above foundry as molding foreman.

BOX 663

FOUNDRY CLEVELAND 13, OHIO

FERROUS METALLURGIST

For high frequency melting. Ground floor opportunity in new division of established company in Western Michigan. Address: Box 645, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Graduate ferrous metallurgist, development research and foundry operation, servicing. Foundry experience desirable. Unlimited opportunities for advancement. Give salary required and experience. Address: Box 637, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

SUPERINTENDENT NON-FERROUS FOUNDRY

Opening available on West Coast to experienced non-ferrous foundry superintendent in long established small jobbing foundry which is constantly growing. Principal requirement is ability to direct production of sound castings in the commonly used bronze and aluminum alloys. Give experience in full, listing past employers, age, salary expected and other pertinent details. Address Box 648, FOUNDRY, Cleveland 13, Ohio.

DIE CAST DIE DESIGNER OR PERMANENT MOLD DESIGNER

Light metals experience required. This is a permanent job with unlimited future for qualified man. Position is in modern midwest foundry facility now undergoing expansion. Salary commensurate with ability. Bonus plan. Send complete resume. Address: Box 499, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY AND MACHINE SHOP SUPERINTENDENT

Experienced in operation of small gray iron and bronze foundry and machine shop. Specialized in the manufacture of machinery and custom work. Must be able to figure costs and to take complete charge. Located in industrial community of 20,000 in New England. Excellent opportunity for advancement. Address: Box 572, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Gray iron foundry experience. Graduate preferred. Travel. Address: Box 636, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For large aluminum sand foundry in the Middlewest. Must be experienced in foundry operations. Address: Box 581, FOUNDRY, Cleveland 13, Ohio.

MELTER

Acid electric steel foundry, carbon and low alloys. Cleveland district. Address: Box 588, FOUNDRY, Cleveland 13, Ohio.

ASSISTANT SUPERINTENDENT

For a production gray iron foundry in the Detroit area specializing in automotive castings. This is an excellent opportunity for a young man with ability to connect with an established company with a long reputation for service to the automotive industry. Must be a man between 30 and 35 years of age with some background of experience in coremaking and assembly, molding practice and cleaning of gray iron castings who is ambitious and capable of being advanced to superintendent as soon as he is able to handle the job. Write giving full information as to age, experience and salary expected. Address: Box 673, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT

Superintendent or Assistant Superintendent. Twenty-two years in all phases of steel foundry, Castings up to 20 tons. Production squeezers and all types of molding machines, slingers and control. Address Box 654 FOUNDRY, Cleveland 13, Ohio.

MANAGER—ASSISTANT TO PRESIDENT

Steel, iron, brass. Thoroughly experienced in every shop operation, metallurgy, engineering, accounting and management. Excellent ability to develop a superior organization by leading, teaching and example. Outstanding reputation for keen analysis, sound judgment and a rare combination of practical experience, managerial ability and effective personality. Address: Box 375, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PRACTICAL GRAY IRON MAN

Desires position as superintendent or assistant superintendent. Good past experience and technical training in all foundry phases. Young and hard worker, employed. Address: Box 670, FOUNDRY, Cleveland 13, Ohio.

ENGINEER

Graduate engineer with 12 years' experience in jobbing and production iron, malleable and steel —equipment planning, construction, plant engineering, methods, rigging, scrap reduction, trouble shooting. Supervisory experience in molding, pouring and iron melting. Presently employed. Prefer midwest or west location. Address: Box 666, FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRYMAN

Available. Capable, qualified and experienced to direct all phases of foundry activities. Light to medium heavy work. Green and dry sand. Well versed in cupola operation and metallurgy. Fifteen years in present executive position. Middle aged. Good appearance. Pleasing personality. Address: Box 603, FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Thirty years' experience in gray iron foundry. Familiar with all phases of foundry operations. Can also quote prices on inquiries. Available after October 1st. Address: Box 614, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Twenty-eight years of foundry experience in grey iron production and jobbing work. Ten years of practical and technical training with eighteen years in executive capacity. Experience in semi or mechanized shops. Age 46, best of references. Address: Box 357, FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD DESIGNER

Able to take complete charge of engineering or foundry. Experienced in aluminum and magnesium. Must be reliable concern. Address: Box 643, FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOREMAN

Twenty years' experience in aluminum and magnesium permanent mold with some die cast experience. Will go anyplace. Address: Box 644, FOUNDRY, Cleveland 13, Ohio.

BRONZE MOLDER

Ornamental bronze molder desires position in Chicago district only. Can take full charge of foundry. Not interested in any other part of the country. Address: BOX 580, FOUNDRY, Cleveland 13, Ohio.

MANUFACTURER'S SALES REPRESENTATIVE

Energetic sales engineer, 36, presently contacting foundries and steel mills in western New York, desires a foundry specialty line. Address: Box 642, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Desires position as General Foreman or Superintendent. Gray Iron or Nonferrous. Practical man. Jobbing or production. 27 years experience. New York State preferred but not essential. Address Box 653, FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER

11 years iron and steel foundry experience. Presently employed desires permanent position in managerial field. Complete experience in all foundry operations. Time-study, standard data, methods, layout, job evaluation and incentive. Box 640, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Would like part time position as consultant in setting up Nodular Iron procedure. Considered the expert in this field. Also A-1 foundryman. For further information address: P.O. BOX 21, BRIDGEPORT, CONN.

FOUNDRYMAN

Twenty-seven years' experience in all phases of foundry practice to take complete charge of small foundry ferrous or nonferrous. Interested in foundry where production costs are high. Have knowledge of casting losses and their elimination. Salary or salary and production bonus. Address: Box 667, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Seeks investment, with services—ferrous and nonferrous. Forty years' experience, apprentice to superintendent, technical training. Salary secondary consideration. Interested in proposition where years of experience will help to produce profits. References, ability, financial status and character furnished at interview. Address: Box 661, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

METALLURGIST

B.S. in Met. Eng. Two and one-half years' experience in metallurgical control involving gray and alloyed iron in cupola and electric furnace. Thorough experience in sand control and core room practices. Some heat treatment. Prefer Ohio or Pennsylvania. Address: Box 662, FOUNDRY, Cleveland 13, Ohio.

Representative Wanted

MANUFACTURERS AGENTS WANTED

New concern, manufacturing Resinoid Bonded Grinding Wheels, has available exclusive territories for reliable agents.

INTERNATIONAL ABRASIVE CORPORATION
500 Fifth Ave. New York 18, N. Y.

Employment Service

FOUNDRY MANAGER — To $15,000
Production Gray Iron, 200 tons daily. Supervisory, administrative experience.

SUPERINTENDENT — To $7,500
Aluminum, magnesium, permanent mold. Handle shop planning, supervision.

SUPERINTENDENTS — To $8,500
(1) Gray Iron; Non-Ferrous pump and pressure work. (1) Machy. castings to 1 ton, non-mechanized. (1) Machy. to 3 tons. (1) Mechanized lite gray iron.

FOREMEN — To $6,500
Molding; Coreroom; Cleaning; Melting.

METALLURGISTS — To $6,000
Positions for Juniors, Seniors. Malleable, Gray Iron, Non-Ferrous plants.

MAINTENANCE SUP'T. — To $8,500
Exp'd. all electrical, mechanical.

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Steel foundry. Handle department.

OTHERS IN ENGINEERING SALES AND ACCOUNTING.

Phone, write or wire:

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EMPLOYMENT COUNSEL, INC.
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$3,500 to $35,000. We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. Address: **R. W. BIXBY, INC., 101 DUN BUILDING, BUFFALO 2, NEW YORK.**

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$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

CLASSIFIED ADVERTISING

Available Capacity

Our expansion program which includes another sand casting foundry allows us to offer approximately 60,000 pounds magnesium castings per month—civilian or defense. Complete pattern facilities, wood and metal, also machine shop. Quotations by return mail.

AMERICAN MAGNESIUM CASTING CO.
3866 ELIZABETH LAKE ROAD
PONTIAC, MICHIGAN

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Wanted-To-Buy

EQUIPMENT WANTED

1—Pay Loader
1—#2 Simpson Mill
1—#3 Simpson Mill
1—Clark Forklift Truck
2—Osborn #559 Jolt Strippers
1—American Wheelabrator Tumblast 36" x 42" with Skip Hoist
1—Osborn #93 Coreblower
State age, condition and best price.

BOX 657
FOUNDRY CLEVELAND 13, OHIO

WANTED TO BUY

10,000 CFM Centrifugal Blower—24 ozs.
Lindberg Fisher 1000# Nose Pour Tilting Furnace.
350# Detroit Electric Furnace.
Heavy Duty Roller Conveyor.
Simpson Mixers.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD STREET
SHILLINGTON, PENNA.
PHONES—READING 30311—40146

WANTED

Tabor squeeze stripping and jolt squeeze stripping molding machines.
Steel apron conveyor for hot castings, 18", 20", 24" or 30" wide.
Also Pottstown tapping machines.
State age, condition and price.

NATIONAL FOUNDRY CO. OF N. Y., INC.
10 SANDFORD STREET
BROOKLYN 5, NEW YORK

WANTED

Urgently require one (1) used charging truck, fork type, for malleable annealing ovens.

BOX 588

FOUNDRY CLEVELAND 13, OHIO

WANTED

BRIDGE CRANES
ARNOLD HUGHES COMPANY
765 PENOBSCOT BLDG. DETROIT 26, MICH.
WOODWARD 1-1894

Wanted-To-Buy

WANTED

Tumbling Mill in good condition. Approximately 32" Diameter by 66" Length.

BRILLION IRON WORKS INC.
BRILLION, WISCONSIN

WANTED

FOUNDRY EQUIPMENT of all types.

We are Equipped to Dismantle.

ALLIED MATERIALS HANDLING CO.
4657 SPRING GROVE CINCINNATI 32, OHIO

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Complete laboratory for chemical analysis of gray iron. Address: STILLMAN FOUNDRY COMPANY, GRAND RAPIDS 4, MICH.

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Electric steel furnace—one, two or three tons, fully equipped giving price all electric specifications. Also give location in order that inspection can be made. Address: Box 607, FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

WANTED

#1 or #1 H Simpson Mixer with loader. Address Box #650, FOUNDRY, Cleveland 13, Ohio.

WANTED

Pangborn type "LK" rotoblast table room or equal. Address: LINCOLN FOUNDRY, LINCOLN, ILL.

WANTED

Tabor 30" or larger, shockless-jar, power rollover, power draw molding machine with air clamps. 1943 model or later. State size, model, condition, location and price. FOUNDRY, Box 664, Cleveland 13, Ohio.

URGENTLY REQUIRED

(1) used tensile testing machine. Capacity up to 120,000 lbs. to test dumbbell type grey iron test bars. Address BOX 672, FOUNDRY, CLEVELAND 13, OHIO.

WANTED

In need of more rod straighteners. Address: BOLEN MACHINE WORKS, INC., GRAND JUNCTION, COLORADO.

WANTED

SANDSLINGER WANTED—Junior Tractor. Address Box 656 FOUNDRY, Cleveland 13, Ohio

EQUIPMENT WANTED

2—Jolt Strippers 10" Draw
2—Jolt Strippers 12" Draw
1—Osborn #602 Jolt Rollover Pattern Draw
1—Osborn #243 or #643 Jolt Rollover Pattern Draw Machine
1—American Wheelabrator 36" x 42" or 42" x 48" Tumblast
2—Osborn #442 or #444 Jolt Rollover Pattern Draw Machines
2—Osborn Coreblowers #92 or #93 or equal

FALL RIVER FOUNDRY CO., INC.
1148 DAVOL STREET
FALL RIVER, MASS.

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ALUMINUM PERMANENT MOLD FOUNDRY Located in Northeastern Ohio. Well equipped with good volume of orders on hand. Low rent. Priced at $20,000. Address Box 649, FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOUNDRY AND MACHINE SHOP

Two brick buildings covering thirty-one thousand sq. feet. Eight ton crane and runway in both shops. Two story pattern shop on 2½ acres of land with spur line, near excellent expanding irrigation district, cheap natural gas and electricity. Located in Southern Alberta, the oil rich province of Canada. Address: BOX 669, MEDICINE HAT, ALBERTA

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Brick and steel foundry with two clear spaces 80 x 320 ft. with overhead monorail, story height 13 ft. 6 in., gable 23 ft., attached building 40 x 50 ft., story height 15 ft. 6 in. and 13 ft. 4 in., has two No. 7 Whiting cupolas 72 in. in diameter. Contains equipment, ideal for mechanized operation, plenty dumping ground, built 1917, composition roof, vicinity population about 9000, near center of U. S. population, expect natural gas this year, served by two major railroads, water transportation available, city hydrant fire protection, land for expansion. Subject to withdrawal without notice. Address: Box 358, FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Grey iron brass and aluminum foundry located in Upland, California. Address: J. L. BULLOCK, RT. 1 BOX 441, MIRA LOMA, CALIFORNIA.

FOR SALE

Established going grey iron foundry in middle west, 15 ton capacity per day, fully equipped. $45,000 complete. Address: Box 665, FOUNDRY, Cleveland 13, Ohio.

SMALL FOUNDRY FOR SALE

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.

SMALL BRASS & ALUMINUM FOUNDRY

For sale in large Midwest industrial city. Excellent business, room for expansion. Only brass and aluminum shop within 90 mile radius. Price $8500. $5000 down, balance terms. Price includes land, nearby new building and equipment. Rare opportunity. Address: Box 641, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Nonferrous foundry in large Wisconsin industrial town. Get in at the start. We have a large volume of defense orders. Owners must retire Price $50,000. Address: Box 504, FOUNDRY Cleveland 13, Ohio.

FOUNDRY FOR SALE

$20,000—completely equipped iron foundry in large Western Michigan city. Includes going business, equipment and inventory. Long-term lease has very reasonable rental. Excellent opportunity for right party. Property may be purchased if desired. Address: Box 668, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Gray iron foundry in Ohio 35 miles from Cincinnati. Cement block building three squares from railroad. Two manual cranes 18' span 75' runway; five squeezers; 34" cupola; air compressors; 4' muller; sand blast; mill; grinders; core oven; core sand mixer; air rammers; aluminum and wood flask and jackets. T-rail and electric hoist for charging. Address: L. C. KIRK, 401 HAZEN STREET, LUDLOW, KENTUCKY.

FOR SALE

About ten ton soft black annealed smooth wire, 100 foot rolls. Nov. 15th delivery. Address: MR. S. J. MOLBY, WICHITA, KANSAS.

For Sale

FOR SALE

13 Walker York coke furnaces some take #22 crucible, 5 with good silica carbide lining and blowers. Others take #20 crucible, 2 silica carbide lined and blowers, remainder minus parts of linings or blowers. BLYSTONE 22" sand mixer with 2 HP motor. Address: THE WELSBACH CORPORATION, 1500 WALNUT STREET, PHILADELPHIA 2, PA.

For Sale

FOR SALE

SAND SLINGER, Beardsley & Piper Model S, 3/60/220/440 volt, steel wheels. $325.00 fob.
Tabor — PORTABLE SHOCKLESS JARRING ROLL OVER & PATTERN DRAWING Machine 24" x 16" $350.00 fob.
AIR COMPRESSOR, Sullivan 11 x 10, 40 hp AC motor and starter $750.00 fob.
MAGNETIC SEPARATOR, Ding's Mfg. 12" x 18" 110 V., S. Ph. motor, 2 hp. Ser. R5771. $600.00 fob.
SAND BLASTING TANK, Pangborn, model 1AV11 $150.00 fob.
SPHERICAL FURNACES, Romph Mfg., cap. up to 3000#
Sly TUMBLING BARRELS
DEGREASING UNITS all sizes
AIR TOOLS
FANS & BLOWERS up to 125,000 cfm
ELECTRIC FEED RAILS & TROLLEYS
FLASKS Barnett & Pressed Steel
HOISTS Electric, hand, air 1 to 10 ton
CONVEYOR all sizes and types.
CRANES overhead & jib all sizes
MOTORS, SPEED REDUCERS, BLOWERS any size
GRINDING WHEELS all sizes
AIR COMPRESSORS from 1 hp up
FOUNDRY EQUIPMENT. Send us your inquiries.

ALLIED MATERIALS HANDLING CO.
4657 SPRING GROVE CINCINNATI 32, OHIO

FOR SALE

TURBO BLOWERS (3 Phase, 60 Cycle)

cfm	Pressure	Make	Motor H.P.	Volts	Speed
3500	40 oz.	Spencer	60	440	1800
2250	24 oz.	Spencer	25	220/440	
2700	16 oz.	Spencer	20	220/3/60	1750
1300	16 oz.	Spencer	10	220/3/60	1750
650	16 oz.	Spencer	10	220/3/60	3600
550	20 oz.	Spencer	5	220/3/60	3475
450	40 oz.	Spencer	7½	220	1750
400	16 oz.	Spencer	3	220/3/60	3500
PRESSURE BLOWERS (3 Phase, 60 Cycle)					
9100	7" SP	Sturtevant			1900
4500	16 oz.	G. E.	30	440	3600
8150/6250	7 oz.	Sturtevant	15	220/440	1800
2500		Bishop & Babcock (40½x50 outlet)			
2300	1" SP	Clarege	3	220/440	1800
800	8 oz.	Nth. Amer.	3	220	3600
660	20 oz.	AllenBillmyre	7½	440	3600
450	6 lb.	A&B	30	220/440	3450
400	4.3 oz.	Spencer	2	220/3/60	3500
340	20 oz.	AllenBillmyre	3	440	3600

MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND, OHIO

FOR SALE

1—403W Osborn Jolt Rollover
1—602 Osborn Rollover
2—American Clay 9' Mullers
1—50" Shell Cupola Blower & Motor
6—275J Stationary or Portable Osborn Molding Machines
15—Tabor Yoke Bar Plain Squeeze Molding Machines
1—Beardsley & Piper Portable Sand Conditioner Core Ovens.

Send for four page listing.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD STREET
SHILLINGTON, PENNA.
R. B. HARRISON, MGR. FDRY. DEPT.
PHONES—READING 30311—40146

FOR SALE
IMMEDIATE DELIVERY

1—Ransohoff Cleaning Mill 48" x 72", Side Loading, Side Unloading—Star Return—with Sand Handling Conveyor complete with tank, pump, switches and motors.—Excellent Condition.

FOUNDRY HOIST

1—3 ton R & M 2 motor AC foundry hoist.

PRESSURE BLOWERS

4—2010 CFM, 29 oz pressure, 12" discharge 15" suction Spencer Turbo Compressor, with 25 HP. 220/440 v. 3 ph. 60 cy. Motors.

DUQUESNE ELECTRIC & MFG. CO.
6428 HAMILTON AVE.
PITTSBURGH 6, PA.
TELEPHONE MO-1-5800

FOR SALE

Conveyorized Ajax-Hultgren type H salt-bath heat treating furnace consisting of separately controlled preheat, high heat quench units. All transformers, pyrometer controllers, etc. Complete for immediate installation. Equipment in first class condition. Write: CENTRIFUGAL FOUNDRY COMPANY, MUSKEGON, MICHIGAN.

CLASSIFIED ADVERTISING

For Sale

FOR SALE

3—"G" Rollover Machines 20 x 8.
2—Osborn J-75 Jolt Squeezers 10".
1—Sprue Cutter with 2 HP Motor.
1—North American Blower with 15 HP Motor, 2100 C.F.M., 16 oz. pressure.
6—10" New—Haynes Jolt Squeezers.
6—12" New—Haynes Jolt Squeezers.
1—Osborn Molding Machine Model 342-4.
1—#36 Osborn Core Draw Machine.
1—Lyon-Raymond Hyd. Lift Truck 2500 lb. capacity.
5—New, 1⅝" Osborn Vibrators.
300 ft. of Good Used ¾" Air Hose in 30 to 75 ft. lengths.
10—New, Squeeze Valves and Handles and 10—New Jolt Knee Valves for Milwaukee Jolt Squeezers
3—Adams Squeezers.
1—1000 lb. Worm Gear Covered Ladles.
1—24 x 48 Tumbling Barrel.
1—#55 Demmler Core Blower.
1—American Sand Cutter Machine Size 89/70 M.
4—Modern pouring devices.
1—International J.D.P. jolt stripper.
42 Set—Truscon Pressed Steel Flasks, 19 x 20, 8 Cope, 8 Drag
42 Set—Truscon Pressed Steel Flasks, 22 x 23, 10 Cope, 10 Drag
97 Set—Truscon Pressed Steel Flasks, 15 x 20, 8 Cope, 3 Drag
4 Set—Truscon Pressed Steel Flasks, 22 x 24, 11 Cope, 9 Drag
37 Set—Truscon Pressed Steel Flasks, 16½ x 33, 8 Cope, 3 Drag
9 Set—Truscon Pressed Steel Flasks, 12 x 27, 7 Cope, 3 Drag
1 Set—Truscon Pressed Steel Flasks, 20 x 22, 10 Cope, 10 Drag
5 Set—Round Pressed Steel Flasks, 25" Dia., 10 Cope, 4 Drag
1 Set—Round Pressed Steel Flasks, 32" Dia., 10 Cope, 4 Drag
1 Set—Round Pressed Steel Flasks, 32" Dia., 12 Cope, 4 Drag
11 Set—Round New Pressed Steel Flasks, 20" Dia., 6 Cope, 4 Drag
10 Set—Round New Shanafelt Steel Flasks, 41" Dia., 7 Cope, 6 Drag
6 Set—Round New Shanafelt Steel Flasks, 38" Dia., 6 Cope, 6 Drag
62—20 x 20 Transite Core Plates
200—14 x 14 Transite Core Plates
187— 8 x 12 Transite Core Plates
270— 8 x 8 Transite Core Plates
1—Whiting Slag Ladle
2—Worm Geared Covered Ladles, 400 to 600 lbs. for Pouring Devices.
1—Cylindrical Ladle.
1—1 Ton Modern Worm Gear Covered Ladle, Teaspout Pour.
1—10 Ton Whiting Worm Gear Ladle.
1—Blystone Sand Mixer complete with motor, direct driven.
1—4 ft. Simpson Sand Mixer.
2—Combs Gyratory Elec. Riddles.
1—Osborn Bumper.
1—Tabor Rollover Machine, 30 x 52 table, with air equalizers and Clamps.
1—International JS-4 Jolt Squeezer.
1—Osborn Jolt Squeezer 76-J.
1—400 Hausfeld Tilting Furnace.
1—Stewart No. 5 Stationary Furnace.
1—Eller Furnace made by Wolverine Fdry. Supply, complete with motor and blower.
1—36 x 54 Late Model Whiting Tumbling Barrel complete with Jones Speed Reducer & 7½ HP. motor.
1—New, 3 Ton Shaw Box Electric Hoist.
1—Model "S" Beardsley & Piper Screenarator.
1—Wells Metal Band Saw Type 9M42.
2—6 ft. Clearfield mixers, motor driven.

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST. KALAMAZOO 52, MICH.

FOR SALE

1—Used No. 404 Clearfield Mixer complete with No. 1 Bucket Loader.
Manufactured by the Clearfield Machine Co., of Clearfield, Pa.
Equipment is in good operating condition.
Inspection invited.
Available for immediate delivery.
Recently purchased larger machine of same make reason for selling.

ERIE MALLEABLE IRON CO.
ERIE, PA. PHONE—2-6431

CLEANING EQUIPMENT FOR SALE

1—American Wheelabrator Tumblast 36" x 42" Good condition, No skip hoist.

1—Sly 8 Ft. Airless Blast Table, two years service, excellent condition, extra parts.

BOX 659

FOUNDRY CLEVELAND 13, OHIO

For Sale

FOR SALE
SAND BLAST EQUIPMENT
Pangborn 6' swing table $3000.00.
Pangborn Rotoblast cabinet, type ES-213. Used for cleaning propeller blade. Price 30% of list.
Pangborn Tumble Blast Barrels, Models 1GF Cap. 1 Cu. Ft; 2-GF 2½ Cu. Ft. Cap. Air type.
Wheelabrator 6' air table $1500.00.
Wheelabrator—27 x 36 complete with dust collector, blower, motors. A honey—$4000.00.
Wheelabrator #1 Tablast 4" dia. with tables and dust collector—$3250.
Sand Blast Cabinets, pressure-tanks, dust collectors and blowers.

DIAMOND SALES INC.
5654 W. JEFF. AVE.
DETROIT 9, MICHIGAN

WHEELABRATOR FOR SALE

American Foundry Equipment Co. Model #3—10 ft. main table. Four 4' auxiliary tables all automatically, electrically controlled; 2 shot peening wheels. Can be inspected in operation. Like new. Write for details.

BOX 652

Foundry Cleveland 13, Ohio

FOR SALE

No. 8 cupola and charger complete—including weigh hopper, transfer car and bucket. New in 1948.

AUBURN FOUNDRY, INC.
AUBURN, INDIANA

FOR SALE

1—Osborn core blowing machine—No. 91-15, almost new, complete with sand reservoir 8½" x 12", opening, blow plate, horizontal clamps, table wearing plate and manually controlled hand and foot operating valves. Excellent condition. IMMEDIATE DELIVERY.

ARCADE MALLEABLE IRON COMPANY
WORCESTER, MASS. Tel: 3-5414

FOR SALE

CUPOLA Whiting No. 4—48" shell complete with I.R. Motor-blower #S-3-47-P4. Excellent condition.

SORBO-CAST CORPORATION
JERSEY AVENUE NEW BRUNSWICK, N. J.

CUPOLA AND OPEN HEARTH EQUIPMENT

1—#7 Whiting Cupola complete with stack. Excellent condition.
10—Blaw-Knox water cooled open hearth furnace doors.
18—Blaw-Knox water cooled open hearth door furnace frames.
3—Sets Blaw-Knox water cooled stack valve dampers.
3—Sets Blaw-Knox water cooled damper type reversing valves.
5—35 ton welded and riveted ladles with stopper rigging.

HETZ CONSTRUCTORS, INC.
P.O. BOX 671 WARREN, OHIO
PHONE: NILES, OHIO 2-2509

FOR SALE

1—New #4 Whiting Cupola
1—Used #4 Whiting Cupola with N. A. Blower & 30 HP motor
1—Sly used exhaust tumbler 30" x 50"
1—8' Pangborn blast table with 6-24" auxiliary tables
1—#2 Wadsworth core machine and 1 HP motor
2—Baird Water tumblers
1—Standard sand mixer 24" x 48" shell
1—American sand cutter 70" swath 5 motors
50—10 x 20 x 2½ x 2½ end pin steel flasks
25—12½ x 18 x 2½ x 2½ end pin steel flasks

BOX 671

FOUNDRY CLEVELAND 13, OHIO

FOR SALE—MOLDING MACHINES

1 Osborn Jolt Rollover Pattern Draw #406.
1 Herman Pneumatic Independent Rollover, Pattern Draw—size 42" x 60".

SORBO-CAST CORPORATION
Jersey Ave.
New Brunswick, New Jersey

For Sale

FOR SALE

CONVEYOR NO. 1 EE FEEDER

2—11' long Conveyors with 20" wide Belt equipped with 1 HP motor with Geared Head speed reducer (belt speed 24 F.P.M.)

CONVEYOR NO. 2 A-A TEMPERING

2—36' long conveyors with 20" wide Belt equipped with 3 HP motor and magnetic head pulley 18" in Diam., 24" wide (belt speed 150 F.P.M.)

CONVEYOR NO. 3 B-B

2—20' long conveyors with 20" wide Belt equipped with 2 HP motor (belt speed 150 F.P.M.)

CONVEYOR NO. 4

2—93' long conveyors with 20" wide Belt equipped with 3 HP motors and 4 plows (belt speed 150 F.P.M.)

The above equipment is manufactured by Trowbridge Co., Clifton, New Jersey. It has never been uncrated, the reason for two of each unit was that I intended to operate 2 five man units. Also I have

2—3 x 5 Simplicity shake outs complete with motors, pulleys and drive belts.

1—12' 12" screw with 5 HP motor and reduction drive

1—No. 4 A section Whiting Cupola with all the parts except stacks

1—Plain-Jar, Power Draw Type Machine #28144 with Adjustable Flask Lifting Pins

1—Magnetic Separator for brass borings

2—Reelites Reels for Electric Hoist (SN 18697 & 18698) 3 Volt King Capacity 35—One never used

1—Type BM 75887 Sandblast Cabinet Size 20

2—Adams Jolt Squeeze Molding machines

2—1,000# Reda Furnaces just like new

1—400# Reda Furnace like new

1 middle size Royer

1—Gardner Rix Air Compressor Serial #24407 Size 4½" Bore—Stroke 4½"

3—Arcade Squeezers

SERVICE FOUNDRY INC.
WICHITA, KANSAS
PHONE 7-9215 HOME PHONE 6-5565

EQUIPMENT FOR SALE

2—Osborn #242 Jolt Rollover Pattern Draw Molding Machines 24" x 48" Table, 1000 lbs. capacity, 12"-19" draw
2—Osborn #403 Jolt Rollover Pattern Draw Molding Machines. Will handle flask size 36" x 44", 12" draw, 1400 lbs. capacity. Excellent condition
2—Osborn #602 Jolt Rollover Pattern Draw Molding Machines 26" x 36" flask size, 11" draw, 900 lbs. capacity. Excellent condition
2—Osborn #601 Jolt Rollover Pattern Draw Molding Machines 24" x 30" flask size, 10" draw, 900 lbs. capacity. Excellent condition
2—Tabor Late Model Jolt Squeeze Pin Lift Molding Machines, excellent condition.

BOX 658

FOUNDRY CLEVELAND 13, OHIO

SAND CONDITIONING EQUIPMENT

1—American Model A.A. Gasoline Powered Sandcutter equal to new 72" cutting wheel.
1—American Model A.M. Electric Driver Sandcutter used 18 months 45" cutting wheel.
1—Molders' Friend Late Model Sand Conditioner Rebuilt ready to run.

BOX 660

FOUNDRY CLEVELAND 13, OHIO

For Sale

FOR SALE

2—24" x 30' Belt Conveyors 5 H.P. motor 220/440 V.
1—Plain Air Jolt Machine Johnston & Jennings 42" x 50" table 10" cyl.
2—#405-104 Osborn Rollover Molding Machines—A-1 cond.
1—#563 Osborn Jolt Stripper Molding Machine, Pit type, table 55" x 63", 7000# jolt cap. A-1 cond.
2—#814-P Osborn Jolt Squeeze Strippers, 14" squeeze cyl., 700# jolt cap., like new.
2—#602 Osborn Jolt Rollover and Pattern Draw, A-1 cond.
2—#147-1 Osborn Rockover and Draw Machnies, specially built for long jobs, A-1 cond.
1—Herman Rollover Molding Machine, 18" cyl., 40" x 60" table, new.
1—Herman Rollover Molding Machine, 22" cyl., 42" x 72" table, A-1 cond.
2—Herman Jolt Stripper Molding Machines, 40" x 72" table, ser. #4109, 4110, A-1 cond.
1—#94 Osborn Core Blower—new.
4—SB-12 International Core Blowers.
1—Pangborn 28 cu. ft. Rotoblast, Type CK with Power Loader.
1—Pangborn 12 ft. dia. Tableblast No. 30 complete with Dust Collector.
1—Dust Collector Parsons #118 complete with 20 H.P. motor & blower.
4—Tumbling Mills, 30" x 60" with 15 H.P. motor.
2—Double stand grinders with 10 H.P. motors.
1—40 H.P. Air Compressor, Pennsylvania water cooled.
Steel Flask Equipment.
98—19" x 26" 3" x 6" drag 4" cope
80—19" x 16" 3½" drag 4½" cope
28—17" x 27½" 4" drag 4" cope
63—22" x 28" 4" drag 4" cope
30—14" x 30" 3" drag 4" cope—Sterling—New
12—16" x 27" 4" drag 4" cope
10—24" Rd. 5" drag 9" cope
All copes are barred
1—5'x9' Hewitt-Robbins JF-9 shakeout—never used.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.
15019 SARANAC RD., CLEVELAND 10, OHIO
TELEPHONE—GLENVILLE 1-1538

FOR SALE
MOLDING MACHINES

2—International power jolt R.O. foot draw for flasks 20" wide, 8" draw
1—Same type for 24" width flasks, 10" draw

1—Simplicity 4' x 8' Vibrating Screen, with 5 HP Motor
1—B. & P. Model "S" Screenarator

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO. NOT INC.
767 MILWAUKEE AVE. CHICAGO 22, ILL.
PHONE: CANAL 6-0314

SAND BLAST EQUIPMENT FOR SALE

Pangborn 6' LJ direct pressure table designed for shot peening or flat work complete with 4AQ1 generator, abrasive separator, conveyor—price $1000.
Pangborn 4' LE table, suction type—price $300.
Pangborn No. 1 type GF barrel, suction type, capacity 1½ cubic feet—price $250.
Pangborn cabinet 4' x 7'—price $200.
No. 80-90 steel grit—$90 ton.

M. ELSTEIN
141 MANGIN STREET . . NEW YORK 2, N. Y.

FOR SALE

1—Used 60" x 144"—jolt rollover—draw; Herman Mouldling Machine. For further information contact:

MR. A. BOLIN—GR 3556
CROWN IRON WORKS COMPANY
1229 N.E. TYLER STREET
MINNEAPOLIS 13, MINN.

CUPOLAS

2 No. 7 Modern Equipment Co. cupolas with inclined charger, weigh hopper, scale and blower. Almost new—for price and details write: BOHN ALUMINUM & BRASS CORP., 1400 LAFAYETTE BLDG., DETROIT, MICH.

FOR SALE

1—Coleman car type mold oven, oil fired, approximately 25 feet long, 16 feet wide, 11 feet high, door opening 8 feet, 4 inches, complete. Address: WEHR STEEL CO., 5234 W. Mobile St., Milwaukee 1, Wis.

For Sale

TUMBLING MILLS FOR SALE

2—Whiting round tumbling mills 42" x 72" with 1¼" shells; combined clutch and brake control; single bench mounting; plain bearings.
1—Whiting round tumbling mill 30" x 72" with one inch shell. T&L pulley drive; single barrel on double bench; plain bearing.
1—Whiting round tumbling mill 30" x 48" with one inch shell. T&L pulley drive; single bench mounting; plain bearing.

THE BUNTING BRASS & BRONZE COMPANY
715 SPENCER STREET
TOLEDO 1, OHIO

FOR SALE

CUPOLA in perfect condition, has been used for only 24 hours. Shell height 36 ft.; shell diam.: 32"; inside lining diam.: 22"; melting rate per hour: 2½ tons, with iron to coke ratio of 10 to 1; blast pipe nozzle inside diam.: 10"; foundation dimension: 48" x 48"; No. of tuyeres: 4; charging door: 14 ft. from floor; charging door dimension: 24" x 20". With one Sturtevant Fan No. 4. Price $500.00 F.O.B. car, St. Jerome. Address: ST. JEROME INDUSTRIES LTD., CASTONGUAY ST. WEST, TEL: 3767, ST. JEROME, TERREBONNE COUNTY, QUEBEC, CANADA.

FOR SALE

Foundry Rods—various diameters

WALLACK BROS.
7400 SOUTH DAMEN AVE.
CHICAGO 36, ILL.

FOR SALE

2—Osborn Jolt, Squeeze, Rollover, Draw Molding Machine
1—Schneible Multi-Wash Dust Collector for 6500 CFM.

GUNITE FOUNDRIES CORPORATION
ROCKFORD, ILLINOIS

FOR SALE

1 H Simpson Muller, loader, excellent—$1600.00.
Core Oven, gas, 8 x 16 x 5 inside, controls, 4 monorail lines, 26 core racks—$3000.00.
Ruemlin AG 48 x 30 Sandblast cabinet—$250.00.
Air Compressor, horizontal 8 x 8, 20 HP—$800.00.
Grinder, double end, 5 HP, 1½ inch arbor—$175.00.
Band Saw, 32 inch, 3 HP, extra wheel, blades—$250.00.
Polishing Lathes, two, 3 HP, 1¼ arbor, each $100.00.
14 inch American Tool Works lathe, belt drive, 4 chucks, etc. $250.00.
Exhaust System, 10 HP, 30 inch fan, cyclone, etc. complete—$500.00.
All motors 440/60/3.
Tilting Furnaces, four, Bellevue 350 lb., oil, with pot—$150.00 each.
Stationary furnace, 350 lb., oil, with pot—$100.00.
Bristol Free Vane temperature controller, extras—$125.00.
Crucible furnace, oil, for #40 or 50. $100.00.
Roots impeller blowers—sizes 47, 59, 67, 717. $50.00 to $150.00.
Combs electric riddles, two, 110 volt, each $75.00.
Tessmer Sprue Cutter, belt drive. $100.00.
Core truck, Chicago Mfg. pneumatic D-1. $100.00.
12 x 18 steel flasks $3.00 each.
Miscellaneous motors, shanks, tongs, equipment, supplies. List on request.

PHILLIPS MFG. CO.
BOX 70
ALMA, MICHIGAN

For Sale

FOR SALE

MOLDING MACHINES
2—Deuscher Stationary jolt squeeze
1—Osborn 74W Plain Squeeze Portable
2—Osborn 75W Plain Squeeze Portable
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers
BLOWERS FOR CUPOLAS AND FURNACES
10—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
1—#47 Connersville-Acme
2—#59 Connersville-Acme
1—Connersville rotary 24 cu. ft. per rev. 6200 C.F.M.
Maxon-Premix Blowers for Gas ¼ to 1 HP
METAL MELTING EQUIPMENT
5—1000# open flame brass melting furnaces, gas fired
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired
New 32" to 41" dia. shell cupolas made to order.
TUMBLING MILLS AND SAND BLAST
1—Pangborn style GJ-1 rotoblast barrel complete with Pangborn style FM automatic loader. Load capacity approx. 16 cu. ft.
1—Pangborn No. 2 GH direct pressure type sand blast barrel, motor driven. Complete unit.
1—Pangborn Sand Blast Unit, including generator tank, shot cleaner, bucket elevator. Suitable for use with room
MISCELLANEOUS
1—American sand cutter 50" blade
1—2-Station Handy Sandy
1—Royer NC-2 sand separator
1—Beardsley & Piper 3 HP Wheelabrator
1—#1 Blystone sand mixer, motor drive
2—#16 Roto-clone units complete
25 Tons steel flasks in sizes from 26 x 26 to 60 x 60
4—Heavy Duty Flexible Shaft Grinders 2 HP
Complete stock of rebuilt mill and dust exhaust blowers

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

SAND BLAST FOR SALE

One New Haven model A sand blast machine; barrel size 36 x 46" with Westinghouse gear motor.

THE BUNTING BRASS & BRONZE COMPANY
715 SPENCER STREET
TOLEDO 1, OHIO

FOR SALE

Royer foundry shake-out — manufactured by Royer Foundry & Machine Co., Kingston, Pa. Grid size 27" x 6'0", powered by a 2 HP Westinghouse type CS induction motor, 220 volts, 3 phase, 60 cycles. Good condition. Grid on machine is new with one complete spare grid. Address: H. B. IVES CO., NEW HAVEN 8, CONN.

FOR SALE

1—20 x 27 Wheelabrator, rubber conveyor belt. Excellent condition—with spare parts—$2500.00.
1—Sklenar furnace, twin burner oil fired. Condition excellent—$950.00.

BUCK IRON COMPANY
ROUTE #1 QUARRYVILLE, PA.

FOR SALE

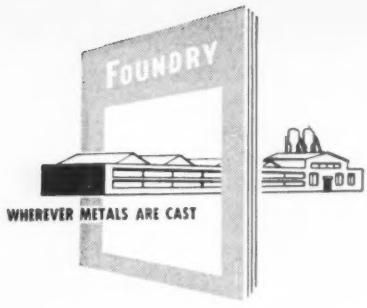
1 Molding Machine manufactured by Herman Pneumatic Company—power jolt, roll and draw 60" x 84". Jarring capacity 18,900 lbs.

Purchasing Department
Minneapolis-Moline Company
Minneapolis 1, Minnesota.

FOR SALE

ROLLER CONVEYOR
all sizes & types

ALLIED MATERIALS HANDLING COMPANY
4657 SPRING GROVE CINCINNATI 32, OHIO



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Main Office

Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices

New York, 17.....60 East 42nd St.
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Westminster, S.W. 1
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Published monthly by

THE PENTON PUBLISHING COMPANY

E. L. SHANER.....*Chairman*
G. O. HAYS.....*President and Treasurer*
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Subscription: United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $3; two years $5. Other foreign countries, one year, $10. Single copies 50 cents. Copies published three months or more previous to date of current issue, 75 cents.

Member: National Business Publications, Inc.; National Association of Magazine Publishers, and Society of Business Magazine Editors.

Copyright 1951 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland, Ohio, under act of March 3, 1879.

FOUNDRY is indexed regularly by
Engineering Index Inc.
29 West 39th St., New York 18.

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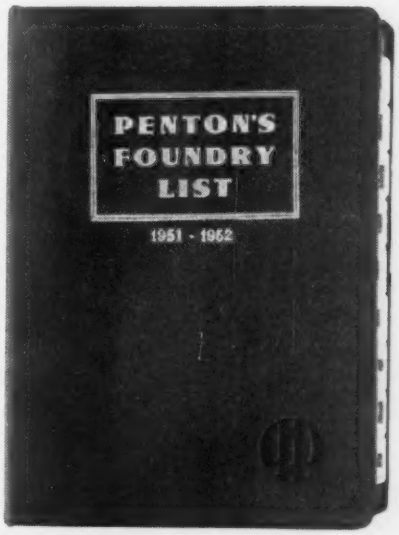
of today's Foundry Market



This volume helps you to know the foundry market thoroughly. The new 1951-52 Penton's foundry list provides you with the most complete information available anywhere on the 5,867 foundries in the U.S. and Canada. It tells *who* they *are*, *where* they are located, *what* they melt, how *big* they are and what departments they operate.

Many sales managers and buyers of castings say they could not get along without it. The price is reasonable. For descriptive literature, write to—

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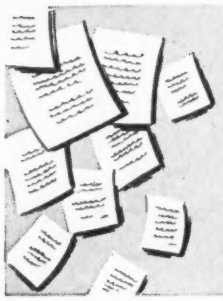

THOTS for today

from the FOUNDRY Business Staff

Saludos a nuestros cuantos lectores funderieros en paises donde se hablan Español. Desde que muchos años nos hemos gustado servir funderieros por todo el mundo. Mientras que no es practico les enviar FOUNDRY imprimido en su lengua, hemos deseado les dirigir un mensaje en su lengua nativa. Si les gustaran leer nuestro "niño de escuela Español", tendrian Vds. la bondad escribirnos que beneficios les reciban de FOUNDRY? Tambien nos seriamos gustado teneries decirnos sus problemas, or algo de interes a nuestros lectores funderieros Americanos. A todos quien respuestan, les enviaramos un don gratuito, un ejemplar de nuestro elegante 32-foliar libro titulado: "Glossary of foundry terms" (Glosario de terminos funderias) Esto libro es escrito en Ingles, pero si les interes, seriamos muy contento enviarles un ejemplar.

★

How do you like our text-book Spanish? *We have wanted to break into print in the native tongue of some of our foreign foundrymen subscribers for a long time. Almost daily we receive a letter which requires translation. More often than not it's referred to Staff Artist, Pat Dwyer, Jr. who comes up with some neat versions like, ". . . this guy says he can't read a word of English but he sure likes to look at the pictures." Bless his heart (the reader, that is)—he can and probably does buy a furnace now and then or a chaplet, perhaps. Anyway, we asked Pat (cute hombre, eh?) to do a turn-about and send the above message to our Spanish-speaking readers for us.*

Senor
Pat Dwyer, Jr.

★

We normally serve foundrymen with subscriptions to FOUNDRY in over fifty-five foreign countries and may (we hope) do so again some day. That number is reduced presently as subscriptions are accepted only from foundrymen in the world's free nations. We are now mailing about 1,500 copies monthly to many countries with substantial distribution in Australia, the Scandinavian countries, England, France, Italy, Japan, Brazil, Mexico and Spain.

★

One World in Metallurgy—our sister publication STEEL has come up with another outstanding reporting job on this subject in a Metal Show special issue. Included is an enlightening review on "Who has the World's Metals?" We think it good reading and can arrange to send you a complimentary copy if you, too, would like to read it.

★

IDEA! How long has it been since your name has appeared in the news section of FOUNDRY? Our editors are constantly on the alert for news of you and foundrymen, wherever you are . . . . but we must and DO depend upon our friends in part to keep posted so we can inform you on what's happening in the industry. Won't you obey that impulse and drop us a line of news about yourself, your associates or your company?

★

Speaking of news . . .. . . an average issue of FOUNDRY carries over 90 pages of editorial material (25 pages of which are news). The Editors like news (big and little items alike). Having put our part of this issue to press, we blow a horn for them and say, ". . . we want to hear from YOU!"

★

Well-said department: "Likability is perhaps the most important single possession of the successful sales representative." —Bill Sadler.

Geo. Sofer

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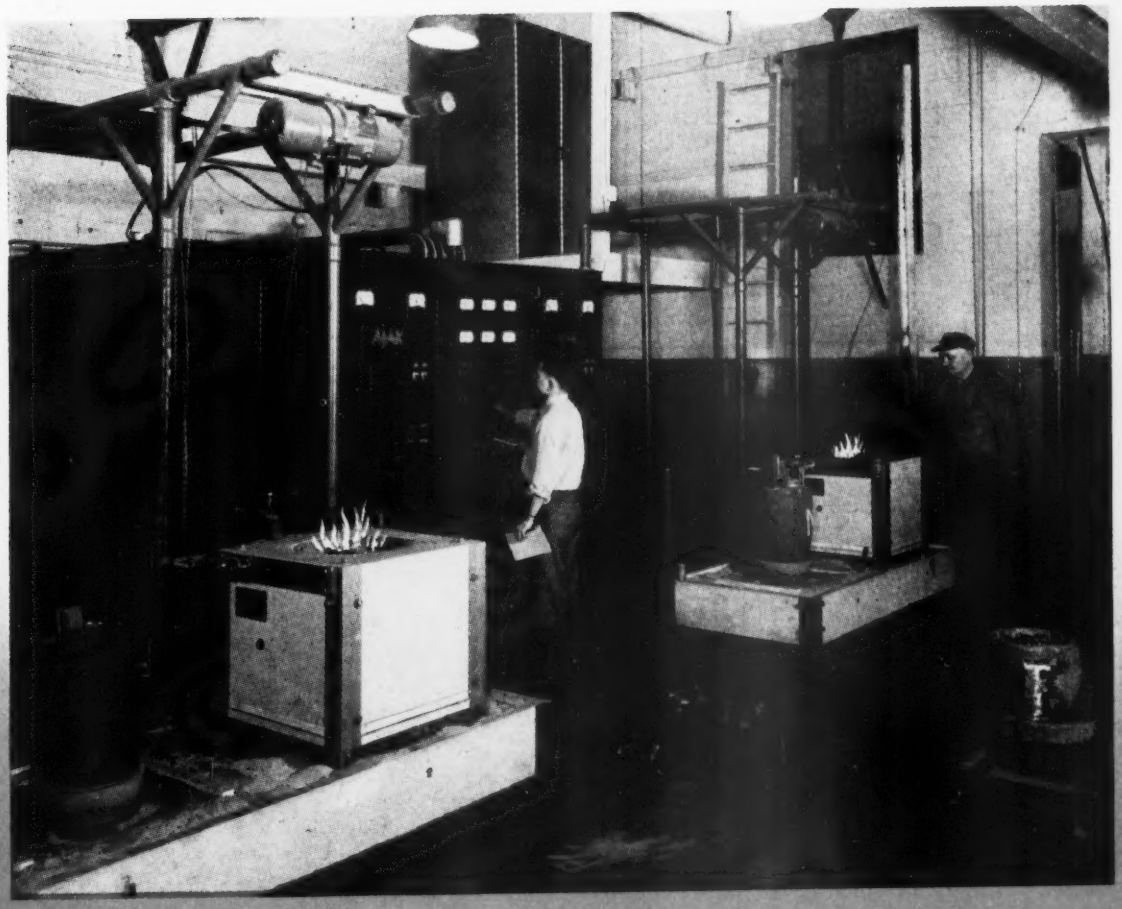

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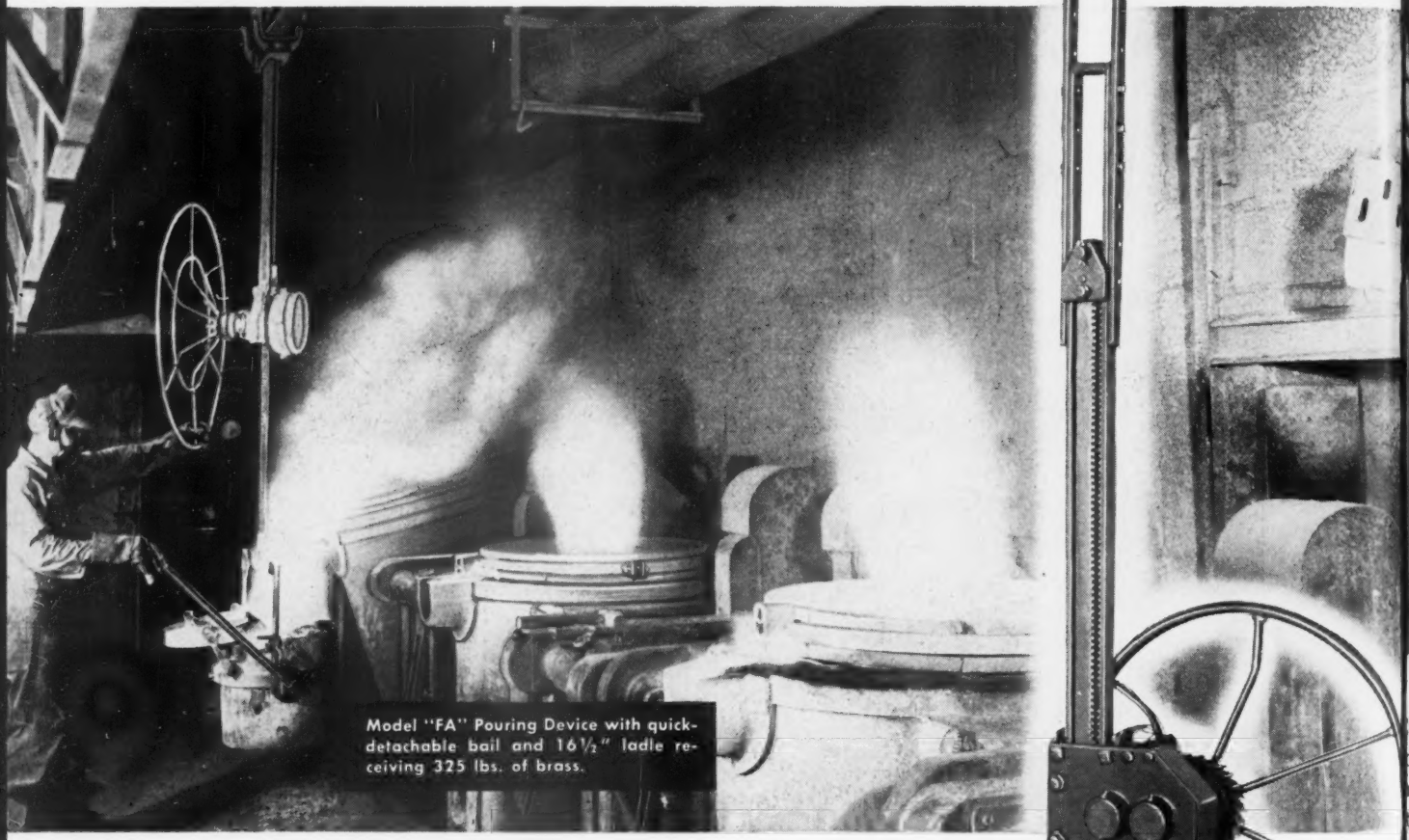
MECHANICAL HANDS

FOR YOUR POUR-OFF MEN . . .



Model "FA" Pouring Device with quick-detachable bail and 16½" ladle receiving 325 lbs. of brass.

Working Together with Practical Foundrymen . . .

MODERN engineers developed the mechanical Pouring Device . . .

Quickly taken for granted were the vastly increased tonnages at the pay scales, improved quality of castings and lowered costs. In later years SAFETY methods and HAPPIER working conditions, which were brought about by the Pouring Device, won further acceptance for mechanical pouring.

Today in thousands of foundries everywhere MECHANICAL HANDS, with human-like precision, reach in to lift out heavier loads of white-hot metal. Each new application suggests other and expanded uses:

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MODERN pouring Devices in four, basic, standard designs in a broad range of lifts and for metal loads from 100 to 1000 pounds is but half the story. There are specials, too! MODERN engineers design and build special devices to do the reaching and lifting in the most difficult places. If your problem is a special one write it up for our full consideration. If it's a standard requirement the coupon can serve as our guide to your needs.

Model "E" Device with plain-hook bail, safety-lock-crucible-shank and No. 60 crucible.

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MODERN EQUIPMENT CO., DEPT. F-11, Port Washington, Wis.

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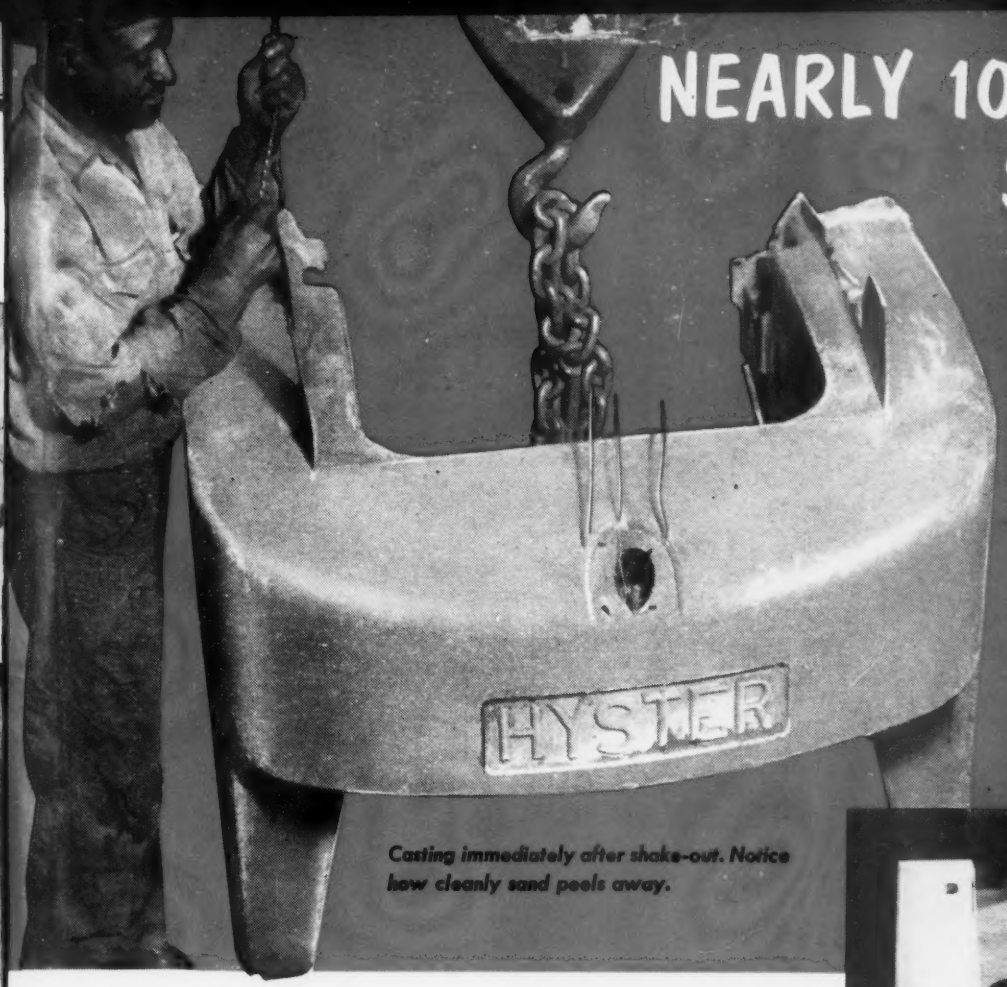
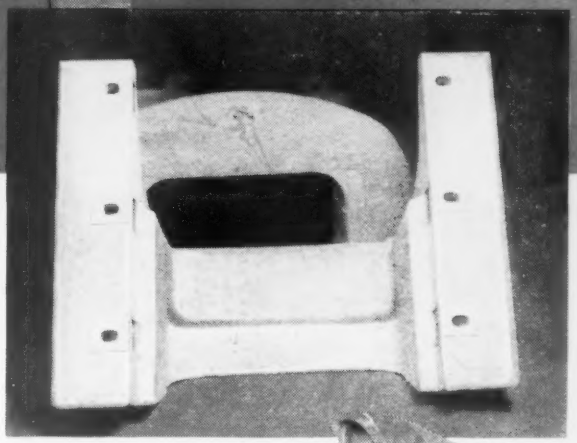


Casting immediately after shake-out. Notice how cleanly sand peels away.



Cored surface of casting for Hyster Karry Krane counterweight.

Hyster Karry Krane showing the large casting which counterbalances crane boom.

halk up another score for Stevens in the satisfied customer olumn. Listen to this report from John M. McCarthy, Jr., general anager, South Side Foundry Co., Peoria, Ill.: "We have selected tevens 180-D Core Wash for use universally throughout our jobing foundry where we manufacture grey iron castings ranging weight from less than one pound to upwards of two tons.

"We are using Stevens 180-D not only as a core wash but also green sand molds. We have found the use of your product sures the sand peeling cleanly from castings of all sizes. Forerly sand stuck to these castings at shake-out, but with Stevens 0-D, applied by spraying or dipping, all cored surfaces are nooth and nearly 100% of the sand drops from our castings.

"Your 180-D mixes easily with water, without foam or bubbles. It as excellent penetration and provides a very tough protective coating cores and molds. After 180-D dries, no cracks or blisters appear."

South Side's experience with Stevens 180-D Core Wash is no olated case. Many other foundrymen can report the same results not just with 180-D but with any of Stevens foundry facings. If u are not now availing your operation of the economies and fficiencies offered by Stevens foundry products, it will pay you ell to investigate. Call in your Stevens representative today and ave him show you how Stevens can bring new profits to your sting operations. There's no obligation.

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In non-ferrous foundries, the Link-Belt Sep-Aerator removes metallic shot by centrifugal action. Both are well engineered, standardized units built for many years of service.

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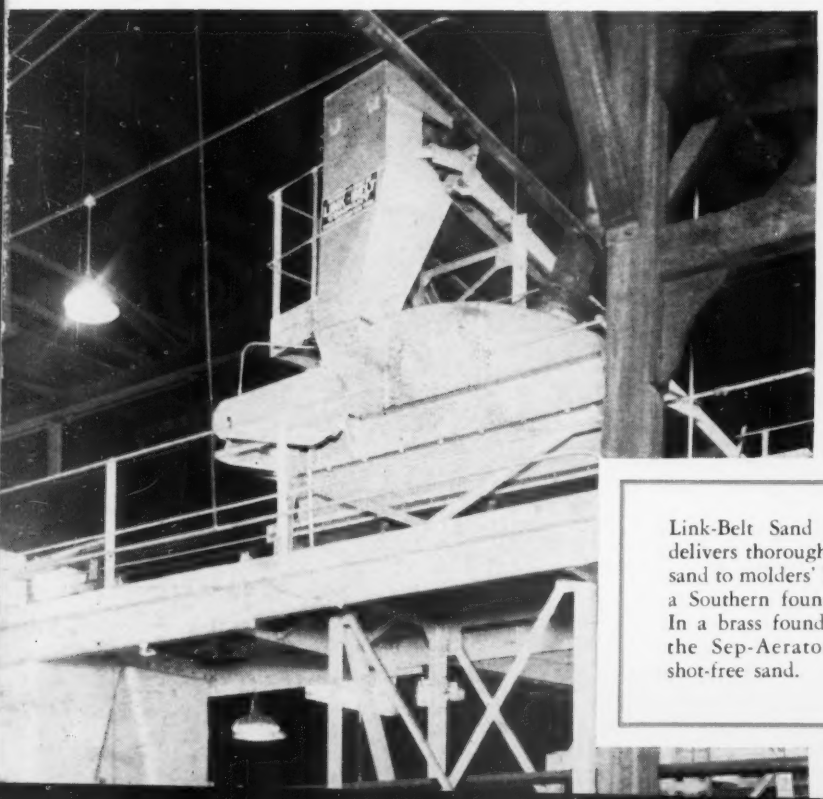

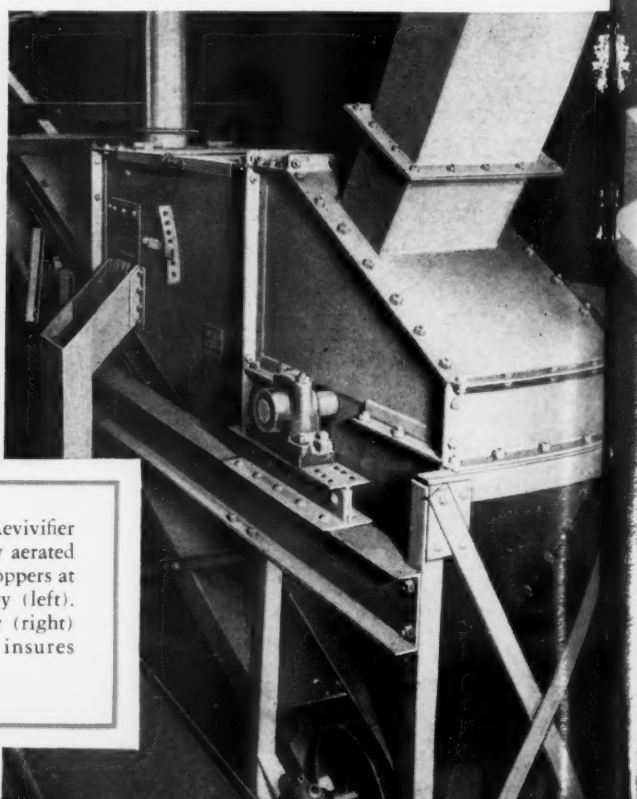

Link-Belt Sand Revivifier delivers thoroughly aerated sand to molders' hoppers at a Southern foundry (left). In a brass foundry (right) the Sep-Aerator insures shot-free sand.